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An Address.[1]

By KEITH COLQUHOUN, M.D.,
Melbourne.

ALLOW me first to express my pleasure at presiding over this Section of Dermatology.

In the choice of a subject on which to address you, I thought it might be of some interest to review very briefly the accumulated knowledge of dermatology which had been achieved by the year 1870. I chose this period for two reasons: firstly, because the chair of dermatology was founded in England in 1869, and in the following year the inaugural lectures were delivered by Erasmus Wilson; and this brings me to my second reason, which may be given as the opportunity which presented itself through these lectures of learning something of a special branch of medicine at this milestone in its progress. The small series of lectures, moreover, will well repay for reading, if for no better reason than the experience of enjoying the masterful wording and composition you will find there.

Wilson reminds us that Hippocrates had evolved an early classification of diseases of the skin, and we envy its naïve simplicity. His ætiological division placed in one group those diseases due to local causes, and in the other the eruptions arising out of constitutional abnormal states, and manifesting the efforts of Nature to throw out the cause.

[1] President's address, read before the Section of Dermatology at a meeting of the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

There is a world of meaning in this classification today, when often enough we are not prepared to state with any degree of certainty on which side of that line certain dermatoses should be placed, or whether some more rightly belong midway.

Wilson's scheme, which we propose to examine, also brought cutaneous diseases under two primary heads, with numerous well-arranged subgroups; but his divisions gave us (i) diseases of inflammation and (ii) diseases affecting function.

In the first of these classes he estimated that eczema accounted for one in every three examples of cutaneous disease; but he included many conditions which are now grouped very differently, such as scabies, impetigo, exfoliative dermatitis and very many others. The *Acarus scabiei* had been isolated at this time, and when found to be present it gave rise to signs and symptoms which complied with Wilson's definition of eczema: "a chronic inflammation of the skin, attended with desquamation, exudation and pruritus". In the light of this it appears strange to find impetigo in the list of eczematous affections, but we sense here a glimmer of its true nature when we read that "impetigo implies a pyogenic disposition of the constitution", and we further learn that Tilbury Fox had appended the suffix *contagiosa*, because it had become apparent that the disease was prone to attack several children at the same time. Psoriasis of those days was the condition which we term today chronic squamous eczema.

The second or erythematous group of diseases of inflammation was a large one, and we find here a good clinical description of what we know as *erythema multiforme*, with its polymorphic phases, each of which constituted a separate entity. Erysipelas was included in this group, and was defined as an intensified erythema exaggerated in all its phenomena.

Group III comprised the phlyctenous affections, and these were represented by miliaria, pemphigus and herpes, a description of the latter bearing the emphasis of its unilateral character and of the eruption following the branches of a nerve in its distribution in the skin. *Dermatitis herpetiformis* is not mentioned, as Duhring first described this disease in 1884, but had recognized it as an entity possessing peculiar features as far back as 1871, just subsequent to the period with which we are concerned.

Group IV dealt with the furunculous affections, and the differential characteristics of each member of the group are concisely set down; they are ecthyma, furunculus, hordeolum or stye, and the largest kind of boil, carbuncle or anthrax.

In the traumatic group of the inflammations are found eruptions associated with the presence on or in the skin of pediculi, pulex, demodex and harvest bug, and it is stated that here also we may include the sting of insects and that of certain plants, such as the poison-oak or vine of the United States of America.

Under the heading of inflammation from specific poisons are found the group of the exanthematous affections, but not syphilis. This disease belongs in its own subclassification, and it is written that "we have some knowledge of the so-called poison of syphilis".

This somewhat cryptic remark possibly suggests an allusion to the hereditary phenomena of syphilis.

The final group of the inflammations deals with those diseases arising from specific constitutional causes, and includes lepra and the strumous and carcinomatous affections. Lepra was the *lepra Græcorum*, today known as psoriasis, and the various clinical types are clearly and fully described. The strumous diseases comprised dermato-scrofula and lupus, with a third form, which Wilson explains is admitted by courtesy only into the same group, namely, *lupus erythematosus*, which it is stated may be looked upon as the least destructive form of *lupus nonexedens*. There is no suggestion of the tuberculous nature of either scrofuloderma or lupus, but, strangely enough, the view was held that there existed an established hereditary connexion between lepra and phthisis, that is, that the children of subjects suffering from lepra are predisposed to phthisis as well as to lepra.

The carcinomatous affections are briefly noted as arising from lowered vitality and defective nutrition—a description is given of early rodent ulcer as originating in the cells constituting the epithelium of a sebaceous follicle or gland, the favourite sites being the cheek, the nose and the inner angle of the eye.

This completes the various groupings under the primary heading of the inflammations, and these, together with the diseases of function, made up Wilson's comprehensive review of the family of diseases of the skin.

Very briefly the diseases of function comprised nutritional aberrations, as they were called, such as ichthyosis, angioma, verruca; neurotic aberrations, for example hyperæsthesia; chromatopathic aberrations, as seen in chloasma, ephelis, leucoderma. Perhaps the most interesting example in the group is that of the phytoses, which are described as aberrations affecting the epithelium and its functions, and it is remarked that the fine granular degeneration of the epidermic scales closely resembles in appearance and behaviour minute plants of the fungi class. The botanists had named them achorion, microsporon and trichophyton. Wilson, however, was obviously sceptical of this vegetable doctrine, as he called it. The classification ends with detailed descriptions of the various affections of the hair, nails, sebaceous and sweat glands, a very complete and discursive summing up of this side of the subject.

In glancing back over this period of sixty odd years, and appreciating the comparative rapidity of the evolution of dermatology up to the present time, we are impressed above all with the great influence which has been operative in the fields of chemistry, pathology and bacteriology in determining this

progress, in the elucidation of so much that was obscure to Wilson and his contemporaries. Even in so incomplete and sketchy a review as I have attempted, it is apparent that these great men were struggling continuously for some further scraps of vital knowledge or proof of theories they held. The Listerian discoveries were not far ahead, and with this dramatic phase of advancement the whole scheme of Wilson's classification would require drastic revision. Although microscopy was an established science even in the sixteenth century, it was not until 1876 that Koch completed his researches in defining, culturing and successfully inoculating the bacilli of anthrax. Endocrinology, obscure enough today, was a closed book, and the sole interest of pathology lay in its obvious association with gross changes in the skin, such, for example, as the relation of comedo to its sebaceous follicle or the accumulation of branny scales in *pityriasis capitis*.

The treatment of diseases of the skin was, of course, primitive in those days, but we may be sure that the physician exhibited the various medicines, salves, unguents and powders in an intelligent and useful manner, and we may imagine the terror with which he would have regarded the armamentarium with which we are now equipped.

They placed great importance on a knowledge of the subject in health if you would treat him in sickness, and that axiom of Cabanis applies just as forcefully today.

The spirit of earnestness which imbued their writings must fill us with admiration, and perhaps we may be well content when we review the mass of fresh knowledge which has been gained during the interval. Let us think over the words with which Erasmus Wilson concluded his series of inaugural lectures before the Royal College of Surgeons. He said on that occasion:

> The young plant which has now been so auspiciously planted by the council will, I believe, thrive and grow stronger, so that in times to come British dermatology, fostered by the Royal College of Surgeons, may become one of the ornaments of British medicine.

And so we may remember those physicians who strove with great purpose and succeeded in placing dermatology on the stable basis of recognition which it enjoys today.

PHYSIOLOGICAL AND BIOCHEMICAL CONSIDERATIONS OF HEPATIC FUNCTION IN HEALTH AND DISEASE.[1]

By Ivan Maxwell, M.D., M.Sc.,
Physician to Out-Patients, Royal Melbourne Hospital; Lecturer in Physiology and Clinical Biochemistry, University of Melbourne.

This communication is primarily concerned with the activities of the liver in health. Only brief reference to disturbance of its functions due to disease will be made, as this aspect of the subject is essentially within the domain of the pathologist.

The liver is undoubtedly the most important centre for chemical transformations in the human body. It has a great variety of functions, the chief of which may be summarized as: storage of glycogen, desaturation of fats, deaminization of amino-acids, secretion of bile salts, excretion of bile pigments, formation and destruction of red corpuscles, detoxication of products of putrefaction of proteins, formation of fibrinogen and regulation of coagulation of blood, storage of the hæmatinic principle, storage of vitamins, adjustment of the reaction of the blood.

In the limited time at my disposal the survey of these individual functions must necessarily be brief, so brief indeed that I beg your indulgence if at times the narrative becomes unduly condensed.

Hepatectomy.

Much light has been thrown on the functions of the liver by studying the changes in the laboratory animal after hepatectomy. Mann and Magath introduced a three-stage method of removing the liver in the dog. Briefly these are: (*a*) Anastomosis of the portal vein to the inferior *vena cava* followed by ligation of the inferior *vena cava* below the liver. This causes blood from the lower limbs in addition to that from the alimentary canal to pass through the liver. The hepatic resistance to the flow of this large quantity of blood is such that there gradually develops a collateral circulation by way of the azygos and internal mammary veins. (*b*) Ligation of the portal vein when this collateral circulation has been satisfactorily developed. (*c*) Removal of the liver in its entirety. Several modifications of Mann's technique have since been introduced, including a one-stage hepatectomy. Some of the results of removal of the liver are indicated presently when discussing the individual functions of this organ.

Storage of Glycogen.

The normal liver stores glycogen in varying amounts, depending upon the nature of the diet previously administered to the animal. Frequently 200 grammes or more may be found deposited within its cells. A diet rich in carbohydrates increases this glycogen storage and, on the contrary, starvation rapidly causes depletion of liver glycogen. This depletion is accelerated by exercise, cold or the administration of strychnine, which causes increased metabolism. During the normal life of man there is constantly occurring either (i) synthesis of glycogen from glucose derived from the food ingested or from protein, and also from lactic acid liberated during muscular contraction, or, on the other hand, (ii) hydrolysis of glycogen (glycogenolysis) which is due to nerve impulses

[1] An abridged form of a paper read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

conveyed by glycogenolytic fibres to the liver or by the action of various hormones secreted by the endocrine glands.

Following hepatectomy there is a progressive lowering of blood sugar and marked symptoms of hypoglycæmia may occur, leading, if untreated, to coma and death. If glucose is given intravenously to such an animal in coma, it may be restored to consciousness and be enabled to walk within a few minutes. Muscle glycogen is not available as readily as liver glycogen for the formation of blood glucose. Hence animals whose livers are removed may die in hypoglycæmic coma when considerable glycogen is still present in their muscles. Lævulose and galactose solutions injected intravenously are valueless in combating hypoglycæmia following hepatectomy, but maltose, mannose and glycogen are effective, though acting more slowly than glucose. Excessive lowering of blood sugar consequent upon the injection of an unduly large dose of insulin induces stimulation of the sympathetic nervous system. Glycogenolytic nerves so stimulated convey impulses to the liver, and glycogen is hydrolysed to glucose and the blood sugar percentage may be restored to normal; furthermore, hypoglycæmia causes an increased output of adrenaline, which also induces conversion of liver glycogen to glucose. There is much evidence that in the liver protein or rather some of the amino-acids derived from protein may be converted into glucose. This conversion is largely uncontrolled in *diabetes mellitus* owing to diminished action of insulin and unchecked activity of the diabetogenic hormone of the anterior pituitary. It seems that the liver is much more resistant to toxic disorders if there is an adequate storage of glycogen in its cells than when glycogen has been removed by starvation. Hence the present procedure in preparation of a patient for operation is to administer abundance of carbohydrates. Carbohydrates are absorbed from the intestine as monosaccharides. Glucose is rapidly absorbed and it can be readily synthesized into glycogen. Cane sugar, maltose and lactose are also equally useful, though slightly slower in being absorbed, as they are disaccharides.

On the other hand, starch is much slower than the disaccharides in its hydrolysis, and hence there is some delay in its being available to the body. The usual method of administration of carbohydrate is by mouth. If the patient is vomiting incessantly, other methods must be considered, such as administration by the rectal or intravenous route. There is much experimental evidence both in human subjects and in animals to indicate that absorption of glucose does not occur when it is administered rectally or, if absorption does occur, the amount is insignificant and of no clinical importance. These findings are of the greatest clinical importance, for it is obvious that if glucose is to be rapidly administered to a person suffering from hypoglycæmic coma due to an overdose of insulin, or from ketosis associated with *diabetes mellitus*, or if an attempt is being made to store glycogen in the liver for any reason, then rectal administration is futile. The addition of glucose to saline solution administered rectally for the post-operative treatment of shock may actually tend to hinder the absorption of the saline solution, owing to the non-absorbed glucose drawing fluid osmotically from the blood vessels in the bowel wall. If the oral method cannot be used owing to excessive vomiting, then the intravenous route must be adopted. A 5% solution of glucose in water is isotonic with blood, and stronger solutions are frequently used for intravenous medication. If much sodium chloride has been lost from the body owing to vomiting or hæmorrhage, glucose in isotonic saline solution may be administered intravenously.

Hepatic syphilis has remarkably little effect in causing disturbance of liver function which can be detected by clinical or biochemical investigation. Jaundice very rarely occurs in the course of this disease, but it may result from the use of organic arsenical drugs in the intensive treatment of syphilis. Such jaundice is usually associated with a Van den Bergh reaction of the biphasic type. A person whose liver has an adequate storage of glycogen is less prone to hepatic disturbance following the use of arsenical preparations than one whose liver is depleted of this carbohydrate.

Desaturation of Fats.

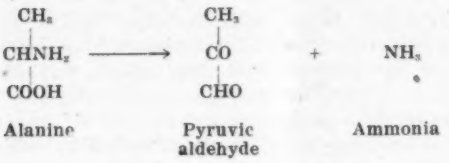
Leathes has suggested that depot fat is transferred to the liver and there undergoes desaturation and is also united with phosphorus and nitrogen and then conveyed to the tissues for oxidation. The question of desaturation of fats in the liver has been much debated in recent years. There is still evidence that it does occur at this site, and probably also in other tissues of the body. A fatty degeneration of the liver or other organ is not a conversion of protein into fat, but is regarded as (*a*) fatty infiltration due to mobilization of fat from the fat depots, and (*b*) the "unmasking" of fat following upon the change of its physical relationship to other constituents of the cell protoplasm, which then enables it to be detected by histological methods. Fatty acids form a constituent of phospholipides, which are found in the protoplasm and also in the limiting membrane of all cells, and thus influence the passage of substances across such membranes.

Recent work by Best and his colleagues at Toronto has indicated that the quantity of fat stored in a normal liver largely depends on the choline content of the diet. In the absence of choline large amounts of fat accumulate in the liver. Furthermore, livers in which excessive amounts of fat have accumulated can be brought back to normal fat content by the administration of choline. If this work on animals is confirmed in human beings, the administration of choline should enable us to control the fat content of the human liver, and the discovery would clearly

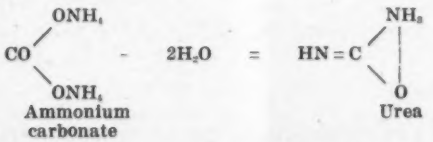
be of the greatest clinical importance. How choline acts in this respect is still a matter of conjecture.

Deaminization of Amino-Acids.

According to the work of Mann and his colleagues, the liver is entirely responsible for the deaminization of amino-acids in dogs. Usually the non-nitrogenous moiety so formed is then oxidized; thus the nitrogen containing amino-acid alanine is oxidized to the nitrogen-free pyruvic acid.



Alternative changes in the pyruvic aldehyde would be by hydrolysis to lactic acid or reduction to propionic acid. Mann found that deaminization practically ceased after hepatectomy. It is probable that in the human body the liver is the chief site of deaminization, but other tissues may play some part in this process. The fate of the ammonia liberated from the amino-acids has been a subject of much research. Mann stated that urea formation in the dog is carried out solely in the liver, and after hepatectomy no fresh urea is formed. The blood urea in these circumstances gradually falls, owing to its loss in the urine, but if bilateral nephrectomy is performed following the removal of the liver, then the blood urea remains at a constant level. The view held for many years is that ammonia unites with carbon dioxide to form ammonium carbonate, and this by loss of water is converted into urea.



More recent work, particularly by Krebs, indicates that ammonia and carbon dioxide unite in the liver with ornithine to form arginine. This is then decomposed into urea and ornithine, and the ornithine set free once more enables the reaction to be repeated. Ornithine is then regarded as a catalyst or carrier for urea formation.

Ornithine + CO_2 + NH_3 = Arginine.

Arginine = Ornithine + Urea.

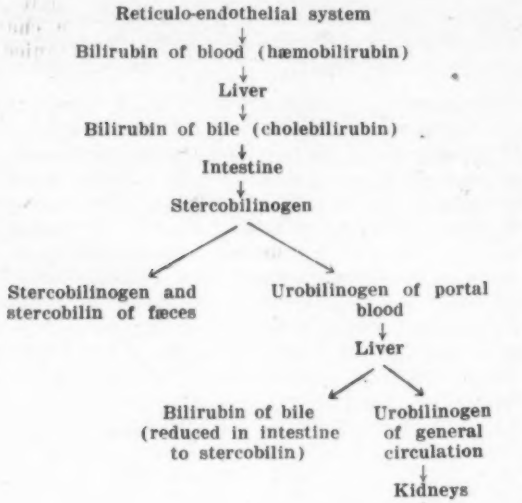
Deaminization in the liver and the formation of urea are only impaired if there is the grossest disease of this organ.

Secretion of Bile Salts.

The bile salts are sodium salts of glycocholic and taurocholic acids which in turn are combinations of cholic acids with glycine and taurine respectively. Cholic acid is very closely related to cholesterol and is a sterol. It has been suggested that it is derived from cholesterol, but this is doubtful. Glycine is a simple amino-acid which is readily formed in the body. Taurine contains sulphur and it is probable that it is derived from cystine. High protein feeding increases the formation of bile salts. They are carefully conserved by the body and undergo the well-known entero-hepatic circulation. The bile salts play an important part in aiding digestion and absorption in the small intestine, particularly of fats. Furthermore, there is evidence that they are of the greatest value in keeping cholesterol in solution in the bile. It has been suggested that in cholecystitis excessive absorption of bile salts occurs from the bile, and cholesterol may then be precipitated in the form of gall-stones. Bile salts, when administered by mouth, stimulate the formation of bile, and they have been strongly advocated in the treatment of cholecystitis, as by increasing the flow of bile and also by increasing the solubility of cholesterol they diminish the tendency to the development of gall-stones, which is so frequent a sequel of disease of the gall-bladder. Incidentally one may mention that since fat, such as butter, increases the contraction of the gall-bladder, it prevents biliary stasis, and it is desirable that some fat be allowed in the diet of a patient suffering from chronic cholecystitis.

Excretion of Bile Pigments.

The formation of the bile pigment bilirubin occurs in the cells of the reticulo-endothelial system not only in the liver, but also in other organs of the body, particularly in the spleen and bone marrow. Certain changes occur in the chemistry of bilirubin during its passage through the excretory cells of the liver, and a different colour with the Van den Bergh reagent is given by the bilirubin of the blood from that with the bilirubin in the bile. By a process of reduction bile pigments in the intestine are converted into stercobilin; some of this is excreted in the fæces, whilst a portion is reabsorbed and is in part excreted by the kidneys as urobilinogen and in part converted again into bilirubin. While the secretion of bile in the liver is a continuous process, its expulsion into the intestine from the gall-bladder is irregular and largely depends upon the ingestion of food, particularly fatty food. The secretion of bile seems independent of the nervous system. The following scheme indicates the origin of urobilin.



If in man the hepatic duct or common bile duct is blocked, secretion continues until a pressure of about 300 millimetres of bile is attained, when reabsorption of bile into the circulation occurs and the patient becomes jaundiced. When fatty food is eaten there is in the normal person a relaxation of the sphincter of Oddi with contraction of the gall-bladder. This may be due to (*a*) a hormone, cholecystokinin, formed in the duodenal mucosa, or (*b*) nerve impulses via the vagus. According to Bainbridge and Dale the vagus is motor to the gall-bladder and inhibitory to the sphincter of Oddi, whilst the sympathhetic supply has the reverse effect. This view of the functions of nerves supplying the gall-bladder is by no means uniformly held by all physiologists. Furthermore, the bile salts which are reabsorbed from the intestine into the portal vein are returned to the liver and act as a powerful cholagogue. Jaundice may be hepatogenous or hæmatogenous in origin. In the former there is obstruction to the outflow of bile from the biliary system, whereas in the latter the bile pigment (bilirubin) is formed in the reticulo-endothelial system in the spleen and bone marrow as well as in the liver. If hepatectomy is performed in the dog, bilirubin soon accumulates in the blood, owing to the continuance of its extrahepatic origin.

Formation and Destruction of Red Corpuscles.

From about the middle of fœtal life to within a short time of birth the liver is an important site of blood formation. In adult life it may resume this function in times of emergency. Destruction of old red cells is in part accomplished by the Küpffer cells found on the walls of hepatic blood vessels and the liberated hæmoglobin is converted into bilirubin.

Detoxication of Products of Putrefaction of Protein.

There is evidence that the liver plays an important rôle in detoxicating various substances absorbed from the alimentary tract. Indol and skatol, for example, are formed in the bowel from tryptophane, and phenol is formed from tyrosine. These undergo partial oxidation in the liver and are normally combined with sulphate and are eventually excreted in the urine as ethereal sulphates.

The Formation of Fibrinogen.

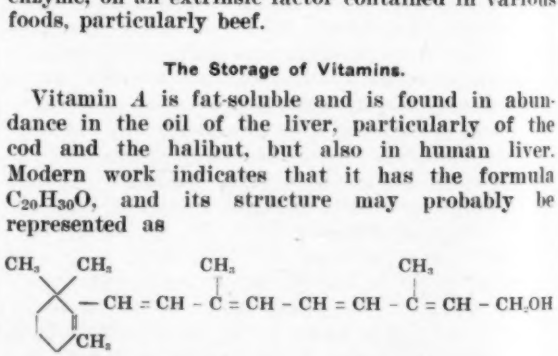
Fibrinogen is a globulin which plays an all-important part in the coagulation of blood, in which process it is converted into fibrin. Following removal of the liver in dogs, the fibrinogen content of the plasma gradually diminishes. If an animal is bled and the blood is defibrinated by whipping and then returned to the circulation, the normal level of fibrinogen is soon restored, whereas in the animal whose liver has been removed this does not occur.

The Storage of the Hæmatinic Principle.

The precise chemical constituent of the active hæmatinic principle in liver has not been determined, but it is thought to be in the nature of a polypeptide containing a complex resembling glucosamine. Wilkinson has prepared liver extracts of such potency that as small an amount as 17 milligrammes will cause a considerable reticulocytosis in pernicious anæmia. There is evidence, produced by Castle and his colleagues, that this hæmatinic principle is produced in the stomach by the action of an intrinsic factor, with properties of an enzyme, on an extrinsic factor contained in various foods, particularly beef.

The Storage of Vitamins.

Vitamin *A* is fat-soluble and is found in abundance in the oil of the liver, particularly of the cod and the halibut, but also in human liver. Modern work indicates that it has the formula $C_{20}H_{30}O$, and its structure may probably be represented as



Man and animals have the power of converting the pigment carotene ($C_{40}H_{56}$) into vitamin *A*.

In addition to being of the greatest importance as a factor in inducing normal growth of the body, it is also credited with possessing anti-infective properties. The vitamin content of the human liver varies very considerably in health. This being the case, it is difficult to assess correctly the clinical value of the figures of the vitamin *A* content of the liver recorded for patients who have died from various diseases.

Vitamin *D* is also found in considerable quantity in liver oil in association with vitamin *A*. It contains the sterol ring and can be synthesized by irradiation of ergosterol. The chief function of vitamin *D* is in promoting the growth of bone in children, maintaining its normal condition in adults, and controlling also the development of the teeth. Deficient supply of this vitamin is the outstanding factor in the causation of rickets and osteomalacia. Vitamins B_2 and *C* are also found in the liver.

Clinical Tests of Hepatic Efficiency.

It has been demonstrated that approximately 80% of the liver in the dog can be removed and no failure of liver function can be detected. Furthermore, if a portion of the liver is destroyed there is a pronounced tendency to compensatory hyperplasia in the remaining portion and normal function is maintained. Hence very gross destruction of the liver substance may occur in disease before it is possible to demonstrate hepatic inefficiency by means of any of the tests at present available.

The tests which have proved of most value are Fouchet's test, Van den Bergh's test, and the tests for urobilin and urobilinogen in urine. It is certain that apart from those tests which indicate impairment of pigment metabolism, no test is at present known that will lead to an early diagnosis of hepatic disease.

Conclusion.

In conclusion I would particularly emphasize certain features discussed in this paper:

1. The futility of any attempt to increase the glycogen content of the liver by rectal administration of glucose in man.
2. The importance of bile salts as cholagogues and in aiding the solution of cholesterol in bile.
3. The intensive storage of the hæmatinic principle in the liver.
4. The important rôle that choline may play in the future therapeutic control of the fat content of the liver.

TUBERCULOUS ARTHRITIS OF THE HIP JOINT.[1]

By T. P. McMurray,
Liverpool, England.

The primary deposit of tubercle bacilli in the hip joint may be found either in the synovial membrane or in bony tissue. The statement has been made that tuberculous infection of the joint is always bony in origin and is never seen as a primary synovial involvement, but clinical observations do not bear out this point of view. In at least 40% of early tuberculous hip infections the limitation of movements of the joint, which is the characteristic sign of arthritis, is at first accompanied by a general decalcification without any definite sign of bone involvement. This stage of loss of bone definition may last for several months, but eventually true bone destruction appears.

The other and perhaps more common route of joint infection is through the medium of primary bone necrosis; in younger children this area of bone infection is seen usually on the superior aspect of the acetabulum, whilst in older children and adults the neck of the femur is more frequently involved. The bony focus is often at first extra-articular, either in the femur or in the ilium, and whilst true arthritis is not present so long as the infection remains extraarticular, movements of the joint are considerably diminished, even at this stage, on account of thickening of the bone round the area of infection, combined with the sympathetic synovitis which is so commonly present in the neighbouring joint.

Differential Diagnosis.

The problem of the differential diagnosis is extremely difficult. We know that in the old days many cases of bony injury and septic arthritis were included under the general title of tuberculous arthritis, and even at the present time it is probable that mistakes as to the type of arthritis present are still being made. In this country it is the common practice to rely entirely for our diagnosis of tuberculous arthritis on a clinical and X ray examination, the value of the various accessory skin and conjunctival tests being considered to be highly problematical.

The clinical signs of tuberculous arthritis of the hip joint may be summarized as a comparatively painless limitation of the movements of the joint in every direction, combined with periarticular thickening which masks the underlying bony outlines. As the disease advances, destruction of bone leads to deformity at the joint, associated frequently with shortening of the limb.

The X ray photographs are also of the greatest importance in the determination of the type of arthritis present. In an uncomplicated tuberculous infection they reveal a gradually increasing local or general bone destruction, the loss of bony tissue never being accompanied by any formation of new bone.

Whilst such clinical examination cannot always be relied upon to give an exact diagnosis, yet the diagnosis of tuberculous arthritis of the hip joint may be made with safety when all these clinical and X ray features are present. Removal of a portion of the bony or synovial tissue from the joint and the demonstration of tubercle bacilli in this tissue by section and by guinea-pig injection remain the only strictly accurate method of determining the diagnosis. Although such a routine examination of pathological tissue from an inflamed

[1] Read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

hip joint must give a more accurate diagnosis, the method has been abandoned on account of the risk of occurrence of permanent discharging sinuses after opening of the infected joints, a complication which increases the gravity of the disease out of all proportion to the advantages gained by the provision of a more certain diagnosis.

Treatment of Tuberculous Arthritis of the Hip.

No definite records are available of the treatment in common use in the early part of the nineteenth century, but in his book on "Disease of the Hip, Knee and Ankle", published in 1875, H. O. Thomas gave a very illuminating account of the many types of treatment then popular. Up to that time it was generally agreed by the medical profession that the only way in which bone destruction could be prevented was by the prolonged distraction of the two diseased surfaces, and that subsequent stiffness could be prevented only by early and constant passive movements of the inflamed joint. He quotes many extracts from recognized teachers of the time stating that rest of an inflamed joint must inevitably lead to rigidity. The kernel of Thomas's publication lay in his statement that the prevention of further destruction of bone, the elimination of pain and the possibility of subsequent movement in the joint depended on complete, prolonged and continuous immobilization of the inflamed tissues. At the present time, with the wealth of clinical observation which has accumulated since then, there can be no doubt as to the truth of Thomas's statement. The essential point in the treatment of tuberculous arthritis must be the complete, uninterrupted and prolonged fixation of the diseased joint, the fixation being continued until the clinical signs and the X ray photographs demonstrate the cessation of activity.

In a study of a large series of photographs of advanced tuberculous arthritis of the hip joint, the most outstanding feature of the whole group is the almost universal widespread destruction of bone. This destruction does not occur equally over the head of the femur and the acetabulum, but is concentrated almost entirely on the upper surface of the head and the upper rim of the acetabulum. These are the areas where the pressure between the femur and the acetabulum is at its maximum. In the normal hip joint, with its close approximation of the head of the femur to the acetabulum, the weight is borne on a wide area of the head and the acetabulum, but in the presence of disease the acetabular cavity is enlarged and the head of the femur and the weight-bearing rest on a narrow area of the upper margin of the cavity. The excessive pressure is caused by two factors: (i) the force of body weight, which in the diseased joint acts almost entirely on the upper surface; and (ii) the reflex muscular spasm which is produced by movements of the inflamed surfaces, and which results in an increase of the intraarticular pressure.

The action of these two forces must be prevented, the deforming force of body weight by conducting the treatment with the patient in recumbency, and the reflex muscle spasm by complete fixation of the diseased joint. Under this line of treatment the intraarticular pressure remains normal and the bone destruction which so frequently follows inefficient treatment is prevented or is at least considerably diminished. Whilst this local treatment is being carried out the patient's general condition must be improved by open air, good food, healthy and interesting surroundings.

The chosen method of fixation of the diseased joint may vary, but there are certain essentials which must be complied with before any particular form of fixation can be considered efficient. These are the following:

1. The splint or frame used in treatment must be rigid in structure and must be so constituted that the diseased joint is held firmly fixed.
2. The diseased joint must remain uncovered so that use may be made of general exposure to sunlight and air.
3. If sinuses are present it must be possible to dress the wounds without movement of the affected joint.
4. It must be possible to attend to the patient for general nursing details without any alteration of position.

All these essentials are obtained by use of the Jones abduction frame. On it the patient is placed with both legs firmly fixed by strapping extensions, and is retained in this desired position without movement of the joint until the signs of recovery are evident. As a rule abscess formation is not seen except in those cases in which it has been present before treatment was instigated. Occasionally a purulent collection develops at an early stage of the treatment, which should be aspirated only when it is threatening to burst through the skin and to produce a sinus, or when, on account of its size and position, it is pressing on important organs. Otherwise the abscess is left alone, with excellent prospects of subsequent absorption.

This, then, can be laid down as the routine treatment to be adopted from the earliest stage of a tuberculous arthritis of the hip joint, and the treatment must be conducted on the same lines until the signs of recovery are apparent. These signs may be summarized as follows: (i) cessation of the usual afternoon rise of temperature; (ii) complete cessation of pain; (iii) absence of any sign of abscess formation or of great thickening round the joint; (iv) improvement in the general health; (v) recalcification of the area of disease, as shown in the X ray photographs.

When all these favourable clinical signs are present recumbency may be discarded and ambulatory treatment may take its place. The length of time during which recumbency is required naturally varies with the resistance of the patient. Thus in some cases the period of complete fixation in recumbency may be eighteen months, whilst in others the favourable signs may not appear for two or three years. It is therefore essential that the various stages of treatment should be employed only in

response to the alteration of the clinical signs, and not used in any rule-of-thumb routine.

Tuberculous arthritis of the hip joint always results in the production of an ankylosis, which may be either bony or fibrous in character. Bony ankylosis never results from infection with tubercle bacilli alone, but only when the tuberculous infection has been complicated by the admission of pyogenic organisms to the area of disease. In other words, bony ankylosis can follow only on mixed infection of the joint, a clinical entity which can be appreciated by the occurrence of discharging sinuses; and if such sinuses have not been present at any stage of the disease, then the resulting ankylosis must be fibrous.

The main principle in ambulatory treatment is the prevention of the deformity which would occur subsequently in the ankylosed joint as a result of weight-bearing. With a bony ankylosis such an alteration of position is impossible and no type of external fixation or support is necessary; but in the case of fibrous ankylosis some sort of supporting apparatus is often essential.

The term fibrous ankylosis merely indicates the nature of the tissue which lies between the roughened surfaces of the femur and the acetabulum. It does not indicate the strength of the tissue or the amount of stability which is present in this joint. Thus, with wide approximation of the femur to the acetabulum and with strong, short, fibrous bands extending between the roughened surfaces, the joint may be so stable that no yielding of position will follow on a resumption of ordinary activities. On the other hand, there may be a very much enlarged acetabular cavity with a narrow, shrunken femoral neck filling only a very small portion of the cavity, so that bony contact is at a minimum. In these circumstances the fibrous tissue filling the remainder of the cavity is long and usually unstable, and will undoubtedly yield to the force of body weight.

It is better, therefore, in describing the ankylosis to use the classification of H. O. Thomas, who described two types: (i) sound ankylosis, which may be either fibrous or bony in character, but which does not alter its angle of fixation as a result of functional activity; (ii) unsound ankylosis, which alters when subjected to the force of body weight and which is always of the fibrous type.

It is evident, therefore, that in the presence of an unsound ankylosis external support is essential when ambulatory treatment begins. This support may be in the nature of a plaster of Paris or leather case, or it may be a single Thomas hip splint. The object of such external fixation is the support of the unstable joint for a period during which the unsound ankylosis may be converted into a sound ankylosis. If such a conversion of long yielding fibrous tissue into a solid unyielding scar does not occur, then there is little object in relying permanently on an external support, and some other means of stabilizing the joint is necessary. External fixation, when employed, should be continued for at least eighteen months, when in many cases it will be found that the joint which was previously unstable has become stable, and the necessity for splintage has disappeared.

There is, however, a certain proportion of cases in which such conversion of an unsound into a sound ankylosis does not occur, and in which, even after prolonged fixation, deformity follows on any relaxation of the support. These are the cases in which recurrent deformity follows on every period of freedom—in fact they constitute that percentage of cases which gives some excuse for the statement that in every instance tuberculous arthritis leads to fibrous ankylosis with recurring deformity and should always be ankylosed by open operation. This statement is not true; in at least 70% of patients treated efficiently by conservative means and followed up carefully for at least five years, tuberculous arthritis of the hip produces a sound ankylosis which gives rise to no trouble and does not alter in its angle of fixation.

It is possible by means of the X ray photographs to decide whether a particular patient will have a sound or an unsound ankylosis when the activity of the tuberculous arthritis has disappeared. When the conditions are such that a broad flat surface of the femur lies in close approximation to a similar area on the ilium, the result will be satisfactory and recurring deformity is almost impossible; but when the disease has resulted in great enlargement of the cavity of the acetabulum, combined with shrinking of the head and neck of the femur, then a sound ankylosis can be obtained only by operative interference.

When it is evident that the conditions present render certain the persistence of a state of unsound ankylosis, the joint should be ankylosed by one or other of the various operative procedures in general use. These may be summarized as follows: (i) intra-articular arthrodesis, (ii) extraarticular fixation, (iii) the combined method.

In regard to intraarticular arthrodesis in which the diseased tissue is removed from the articular surfaces of the femur and acetabulum, raw, bony surfaces being left in contact, the operation has been so unsatisfactory in producing an ankylosis that the method has now been generally abandoned.

Extraarticular fixation carried out at an early stage of the disease results in the formation of a bony bridge between the femur and ilium. Such an unyielding buttress maintains the separation between the diseased femoral head and the acetabulum and prevents their approximation, which is so essential for stability, leaving a wide gap filled with fibrous tissues, so that the support of the limb rests almost entirely on the bony buttress.

The combined operation is undoubtedly the method of choice; when efficiently performed it results in the removal of all the diseased tissues and in the formation of a sound bony fixation with approximation of the femur and ilium. The operation should never be undertaken in the acute stage

of the disease when the decalcification is progressing, but should be postponed until the signs of recovery are present. These signs may be classified as follows: (i) recalcification of the infected bones; (ii) absence of sinuses; (iii) absence of active disease in other tissues, such as the lungs and the kidneys; (iv) absence of swinging temperature.

Even the presence of an old-standing abscess in the region of the diseased joint does not contraindicate operative interference. In other words, arthrodesis of the hip should never be performed for tuberculous arthritis, but may be necessary for unsound ankylosis which has followed on tuberculous infection of the joint.

TREATMENT OF TUBERCULOUS HIP IN CHILDREN.[1]

By L. O. BETTS,
Adelaide.

THE amount of surgical tuberculosis in Australia is comparatively small, so that no one surgeon sees enough of it to gain sufficient experience to be very dogmatic. This is particularly true of South Australia, where the total number of tuberculous hips in children would amount to less than 100 in twenty years. However, over the last ten years I have been privileged to see and treat personally almost all patients with tuberculous hip admitted to the Adelaide Children's Hospital and later transferred to our seaside home at Escourt House.

During that period there have been 43 patients under my care at some stage in their treatment, and a report on these will be my contribution to this discussion. All except one (who emigrated to Queensland when the condition was quiescent after three years' treatment) have been seen by me personally or communicated with within the last two years, and they constitute almost all the cases that have occurred in this State within the last ten years.

Methods of Treatment.

Until nine years ago, methods adopted in this State consisted in immobilization of the joint in a Thomas hip or box splint with weight extension, in the open air, until apparent quiescence occurred; this was followed by ambulatory treatment in a Thomas hip splint with a patten and crutches for a prolonged period.

For the past nine years Liverpool methods have been in use and efforts have been made to carry out the dictum of Thomas, that rest to the joint should be "enforced, uninterrupted and prolonged".

The children live in an open air pavilion at the seaside. This faces east, away from the sea, so as to avoid the hot afternoon sun and the prevailing strong winds in winter. At least three hours of exposure to the air and sun are given daily, and we have been careful not to expose the patients to the sun in the hot weather. They have the usual high vitamin generous diet, with regular schooling for all children who are old enough.

This home has no X ray facilities, and many patients in this series were treated, after diagnosis was established, without X ray control until they were ambulatory and returned to the out-patient department again, a period ranging from one and a half to three years. (This is by no means ideal, and arrangements have recently been made for X ray examinations as required.) I have had to rely on clinical signs of progress.

Steady improvement in the general condition, accompanied by clinical signs of local improvement, have, in my experience, proved a fairly reliable guide. All efforts were made to diagnose cases at the Adelaide Children's Hospital before transfer, and doubtful cases, of which there were many, have been eliminated from this series.

Local Treatment.

Fixed extension on a Jones abduction frame for twelve to eighteen months is the method of immobilization, maintained until all spasm has disappeared and the hip is apparently quiescent. This is followed by the application of a plaster spica, from the toes to the lower part of the thorax, ample room for respiration being allowed by cutting a low "V" front in the plaster. After at least three months' recumbency in the spica the child is allowed to turn about in bed as he wishes for another three months before ambulatory treatment commences on crutches and a patten.

Weight-bearing is not allowed until the patient is doing well generally, the hip shows no sign of activity and X ray examination reveals some recalcification. This is usually about the end of the third year. Weight-bearing is commenced by freeing the foot from plaster first, later lowering the patten, and finally relinquishing the latter and then the crutches. Then, if all goes well, the spica is shortened so that the knee can be mobilized for about three months before all splinting is removed. During this stage the patient attends the physiotherapy department for education in walking. A good walk from the knee, with quadriceps control, lessens the stresses and strains on the hip joint on its release from splints. The periods given are minimal.

All surgical supervision and treatment at the home has been done by myself at weekly visits, the detailed care of splints *et cetera* being in the hands of the nursing staff, there being no resident medical officer. These details are given for the purposes of comparison, as one finds that in most series reported in the literature the methods of conservative treatment followed are not given in detail. Essentially true conservative treatment means attention to small details over a long period.

[1] Read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

After being freed from all splinting the children are kept under observation, and any increasing adduction deformity is watched. In the earlier cases in this series an osteotomy was done early, but experience has proved that it is better to leave this until the joint deformity ceases to increase, or until deformity becomes so pronounced that serious wrenching stresses are put on the ankylosed joint. Transtrochanteric osteotomy has usually been performed and the corrected position obtained by fixed traction in the abduction frame. This ensures no loss of length from the operation, and one can check the position for three or four weeks before placing the child in a spica.

If the patient is placed in a spica immediately after operation there is usually a definite loss of length, which is a serious disadvantage, apart from the fact that it is very difficult to obtain the exact position required.

The 43 patients (of whom 28 were males and 15 females) have been divided into three groups.

Group I, 27 patients, received practically continuous treatment by the methods detailed.

Group II, ten patients, had weight extension in Thomas or box splints, followed by application of a Thomas splint and patten, and their treatment was finished as in Group I. The treatment was not uninterrupted, nor were the patients all recumbent until quiescence occurred.

Group III, six patients, had various treatments similar to those in Group II, but more interrupted and haphazard.

The results are shown in Table I.

TABLE I.

Condition of Joint.	Group I.	Group II.	Group III.	Total.
Good mobile hip ..	2	—	—	2
Bony union	6	2	3	11
Sound fibrous union ..	10	4	—	14
Unsound fibrous union	2 moderately good function. 1 unsound.	3 moderately good function. 1 good function.	2 poor function. 1 poor function.	7 3
Pseudarthrosis ..				
Total cases ..	21	10	6	37[1]

[1] Thirty-seven patients are still under treatment.

Of the six cases in Group I with bony union, only two were due to sinuses with mixed infection. No abscess was detected clinically in any of the other four.

If Group III is excluded, we have 31 hips, of which 22 are soundly ankylosed. In eight the ankylosis is bony, three only with sepsis. In fourteen sound fibrous union is present. Two hips are mobile and there is a good functioning joint. In five cases ankylosis is unsound. Four of these could be fused by operation without difficulty. Two patients have a pseudarthrosis, one with good and one with poor function.

In addition to one patient with a normal hip in Group I, there was another in Group II who had a second lesion in the neck of the other femur; this patient recovered with a normal joint, which has stood active use for seven years. In both of these the lesion was confined to the femoral neck. There has been only one death, following an attempt (the sole attempt) at operative fusion in a girl aged eleven years. Further details of treatment are set out in Table II.

TABLE II.

Group.	Average Shortening. Inches.	Time under Splint Treatment. Years.	Abscesses.	Osteotomy.	Osteotomy Still Required.
I	1·1	4½	8	7	4
II	1·8	5 1/10	5	6	2
III	All except one very marked shortening.	—	4	2	—
Total..	—	—	17	15	6

Of the eight abscesses in Group I, seven were present when treatment was commenced.

There were only four patients in Group I with two or more inches of real shortening, the greatest being three and a quarter inches. All of these were under indifferent treatment for a long period before arrival at the hospital. This suggests that early efficient treatment has a definite influence in lessening the total amount of destruction.

Although the average real shortening is shown, this may not be the final result in recent Group I cases, as interference with the epiphyses may still produce further shortening, but a study of our records shows that after the active process has ceased the limb grows well and does not progressively lose length.

Progressive adduction deformity has been a common feature, but in most of the older cases this has come to a standstill. Much emphasis has been laid on this tendency in tuberculous hips, but is it not true of any hip seriously damaged by any inflammatory process? The study of skiagrams in the American literature shows that it occurs for long periods after operative fusion in children. The destruction of bone with the corresponding shortening of the limb in this series compares favourably with results obtained elsewhere.

What can we hope for from conservative treatment? We can hope for:

1. Complete restoration of function, which should be an ideal not lost sight of.

2. Bony union, which usually follows an abscess with mixed infection, but which, as demonstrated in this series, does occur otherwise.

3. Firm fibrous union, which in many cases does become bony in time.

4. Loose fibrous union and pseudarthrosis with a loose hip following great destruction, the end results we do not want and in our small experience infrequent if treatment has been carried out conscientiously.

Complete restoration of function will be achieved rarely, but as many patients are seen while the disease is still in the femoral neck or pelvic bones, and then not involving the joint, a normal hip should be obtained more frequently. This depends on early diagnosis, of which more will be said later.

Bony union will not be frequent early, but firm fibrous union can be obtained in the majority of cases by consistent conservative measures. It is said that recrudescence occurs sooner or later in hips with union that is not bony. But is this correct? Local experience is against it. I have made inquiries from the surgeons who would have seen most of such cases, and in their experience such recrudescence is not common.

For the greater part of the past nine years I have been the only surgeon in this city practising orthopædic surgery as a specialty, and I should have expected some at least of those old hips to have come under my notice. Apart from a few very old cases, in which joints were grossly destroyed and severe deformities were present, I have seen only one of these cases, though many patients with deformed septic hips have appeared in my consulting rooms. Yet, under previous methods of treatment, loose fibrous hips should have predominated.

Importance of Early Diagnosis.

It cannot be too strongly emphasized that any child with a limp requires serious attention. Every attempt should be made to arrive at a diagnosis. Should the child present evidence of an arthritis of the hip, the joint should be treated as a tuberculous hip until it is proved otherwise or until symptoms have cleared up.

It has been my practice to place such patients at rest on an abduction frame for six to eight weeks. Should the joint then be free of symptoms, the X ray appearances normal and a comfortable range of movement be present, the limb is freed of all restraint and the child is allowed to mobilize the hip in bed. With no recurrence of symptoms and full range of movement, weight-bearing is allowed and walking is resumed, a close watch being kept at regular intervals for a few months.

Under such treatment cases of mild non-tuberculous arthritis clear up. In tuberculous arthritis there is a steady relapse. In those hips in which the lesion is in the adjacent bones but is not definite enough to be discovered by X ray examination, there is usually some limitation of movement in all directions, though it may be very slight. In the latter case treatment should be continued until X ray examination proves positive; or if the appearances remain normal, a Thomas hip splint with patten and crutches is fitted while any doubt remains.

Non-tuberculous lesions with definite destruction require the same treatment as tuberculous lesions, the results of X ray examination usually deciding the diagnosis during the course of treatment. Here the problem is an academic rather than a clinical one. Only by such means shall we save joints occasionally from total destruction. We should avoid the possibility of missing the type of tuberculosis with slow onset and recurrent attacks of limping. The lesion is then usually on the acetabular side of the joint, about the "Y" epiphysis, and is very easily missed in the X ray films. Areas of decalcification are common about this area in normal hips, but with any signs of a mild arthritis these should be suspect, more prolonged treatment instituted and the patient kept under constant observation.

Skiagrams of varying exposures and position may be helpful. The usual antero-posterior exposure does not give a good picture of the acetabulum; stereoscopic films are unsatisfactory in children, so various oblique positions should be tried to attempt to locate any area of destruction about the "Y" epiphysis.

Four such cases in our own series were missed over long periods; two of the patients should have recovered with normal hips, and the others with very much less destruction than was finally achieved. Although the disease usually progresses for some time in spite of treatment, early treatment will greatly lessen the total amount of destruction of bone, and this should be one of our most important aims.

All patients have given a positive reaction to the Mantoux test, and we consider a negative response to the Mantoux test conclusive evidence that a suspected hip is non-tuberculous. Contact with a patient suffering from active pulmonary tuberculosis was proved in a large proportion of these patients, seven of them having lost their fathers with it.

The Minimum Period of Time Required to Obtain Healing.

One patient in this series, with a lesion in the neck, showed healing without joint involvement, and will bear closer study.

Here the tuberculous process had advanced under treatment, then became stationary and went on to complete healing within the bone. There were none of the usual slight disturbances that affect a tuberculous joint. Nature was not called upon to remove cartilage and the resistant articular surface of the bones.

Yet we see that after three years and nine months there are still some slight changes in the bone that would flare up with any trauma, and not until after five years is the bone practically normal.

From this we might deduce that weight-bearing should be late and crutches with a patten retained for a long period.

Late weight-bearing is essential for another reason, to obtain the minimum destruction and thus minimum loss of length of limb. In Perthes's disease the treatment has become truly conservative by relieving the affected epiphysis from weight-bearing by prolonged rest in bed, and this treatment has produced results never before obtained.

Surely the sorely stricken epiphyses in a tuberculous hip joint require to be protected for a much longer period. Any treatment that allows early

weight-bearing should not be called conservative, for it is assuredly increasing the total destruction, directly by its crushing of the soft decalcified bone and indirectly by maintaining activity in the tuberculous process for a much longer period than necessary.

The Cessation of Splinting.

It is difficult to determine when splinting should be discontinued. Our practice is to proceed gradually from crutches and patten to a spica with no patten, and finally to a short spica to finish with. With quiescence and the general condition good clinically, and with a confirmatory X ray examination, we may release the child from splinting, but keep it under close observation. The difficulty of determining when to release a limb from splints I learned personally from Sir Robert Jones. One day, after I had examined a patient, he asked me if the splint could be taken off. I thought it could. "Yes", he said, "so do I, but I think we'll keep it on another six months."

The Best Functional Position for the Fixed Hip.

We have always aimed at 20° of flexion and slight abduction, the latter varying according to the loss of length. Slight hip flexion necessitates greater mobility of the lumbar spine in flexion, which in youth easily adapts itself to this.

Higher degrees of flexion at the hip give a poor gait and cause excessive lordosis, throwing more strain on the posterior lumbo-sacral joints, thus increasing the risk of arthritic changes in later life.

Operative Fusion.

In adults fusion by operation is generally accepted as the method of choice; but the position is different in children. Fusion is difficult to obtain in young children, and a long period of conservative treatment is necessary to overcome the tuberculous infection in any case.

Perusal of the literature demonstrates that solid bony fusion occurs very slowly after the bone-grafting operation; and Hallock, who has had great experience in the Hibbs clinic, and who is an ardent advocate of this operation, recently stated:

> Subsidence of the disease does not rapidly follow on fusion, and for complete replacement of the diseased area by healthy appearing bone, usually three to five years are required.

Why not treat the patient conservatively until quiescence occurs and then operate if an operation is deemed necessary?

The position, as I see it, has been best expressed by McMurray, who, in advocating fusion only in cases with loose fibrous union, states:

> Here at the end of treatment, when the disease is cured and when the only disturbing factor is the tendency to adduction, a bony fixation of the hip joint is justifiable, and can be carried out with a much greater hope of success than when it has been performed in the early stages. Bone grafting in the treatment of tuberculous arthritis is not curative, nor does it tend to shorten the course of the disease, but if used when the disease is cured, it may prevent a deformity that would otherwise be troublesome.

Conclusions.

1. Conservative treatment conscientiously carried out will produce quiescence in the hip with ankylosis, sound and fibrous in most cases.
2. Osteotomy will usually be required to get the best functional position some years after quiescence.
3. Although bony ankylosis is the ideal, when this has not occurred the question of arthrodesis should not be considered until the hip has been treated as above for some years and the child is old enough for arthrodesis to be safely performed—at about the age of fourteen years or more.

Acknowledgements.

Finally I would thank my ex-colleagues on the staff of the Children's Hospital for help given, and the staff of the X ray department and of the records department for the trouble they have taken in collecting material for this paper.

THE TREATMENT OF TUBERCULOUS HIP.[1]

By J. G. WHITAKER, M.D., M.S. (Melbourne), F.R.C.S. (England), F.R.A.C.S.,

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THIS paper will deal only with tuberculous hip as seen in children. It is based on a study of all cases treated at the Frankston Orthopædic Section of the Children's Hospital.

Most grateful acknowledgements are made to all those who have worked at Frankston: to Mr. J. B. Colquhoun, who, as first medical superintendent, so ably pioneered the work there and is now honorary surgeon; to Mr. C. H. Osborn, now unfortunately no longer with us, who did most valuable work on arthrodesis; to Mr. D. O. Brown and Mr. E. E. Price, who, with Mr. J. B. Colquhoun, are my present colleagues; and to Mr. Douglas Galbraith, medical superintendent, to whose energy and enthusiasm much of the success of Frankston is due.

NUMBER OF CASES.

Since the opening of Frankston in 1930, 63 patients with tuberculous hip have been admitted, being an average of ten cases a year. This may be taken as all the cases occurring at the Children's Hospital and a large percentage of those occurring in Victoria.

DIAGNOSIS.

Two factors must be present to sustain the diagnosis of tuberculous hip, (*a*) a positive response to the Mantoux test, (*b*) characteristic X ray changes.

[1] An abridged form of a paper read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

It is not suggested that the initial lesion cannot be primarily synovial. Of the 63 patients at Frankston, approximately 15% have not shown X ray lesions on admission, but all have shown these changes during the course of treatment. It follows from this that whilst the lesion of the hip may be primarily synovial and remain so for a variable period, the bone is always finally involved.

From the group of cases which may be described as "non-proven", with positive clinical signs of tuberculosis of the hip but persistent negative X ray findings, emerge those with terminal movable hips. These cannot be accepted as cases of proved tuberculosis.

Cases clinically tuberculous, but with normal X ray findings, must all be treated as tuberculous. The future alone can decide their true nature. If they are tuberculous, X ray signs will develop during the course of treatment and establish the true diagnosis.

In the cases at Frankston finally accepted as tuberculous, the patients have all yielded positive results to Mantoux tests. A negative result to a test is more important than a positive result, and if the result is negative repeatedly this is final evidence that the condition is non-tuberculous. Standardization of technique is necessary for consistent results in this test.

Nature of Infection.

Tuberculosis of the hip must not be looked on as an isolated infection of the joint, but as part of a systemic infection. Dr. Reginald Webster has shown that joint tuberculosis is brought about by invasion by the human type of the *Bacillus tuberculosis*. This does not appear to be a universal experience, but it is strongly supported by our experience of the tremendous importance of contact with an open tuberculous lesion as the source of infection. Whether the primary lesion of the hip joint is bony or synovial is indefinite. The long history often obtained in a case of tuberculous hip points to a frequent primary bony focus, with only later synovial infection.

Course of the Disease.

The average and typical course for this condition to follow may be discussed as cyclic (see Figures I to VIII). Some cases are naturally more severe than others, but the following four phases may be noticed in all. The fact that the patient is being treated under the best conditions does not alter the cycle; it minimizes and shortens some phases of it.

The various phases are: (*a*) the period of onset, (*b*) the destructive phase, (*c*) the quiescent period, (*d*) the period of repair. It must be clearly understood that the course of this condition is best followed by serial X ray photographs.

The Period of Onset.—There is in the period of onset a bony focus, either in the femoral head or the acetabulum. This may not, as stated above, be obvious at the onset.

The Destructive Phase.—The destructive phase is the critical time of the disease. Adequate treatment is instituted, but this phase steadily marches on. This period may well be called the "period of dissolution of the joint". There is always present destruction of the acetabulum and head, with a steady upward march of the head. A big factor in this must be the upward pull of the thigh muscles. This upward march of the femoral head constitutes the big challenge in the conservative treatment.

This destructive phase occupies approximately eighteen months, and passes imperceptibly into the quiescent stage. During the destructive phase general decalcification is always present and abscesses are sometimes seen.

The Quiescent Period.—There comes a time when destruction ceases. This is not accompanied by any particular clinical signs.

The Period of Repair.—The period of repair is characterized by a general increase in the bony density, with calcification of any abscesses present and subsequent bony ankylosis.

Duration of the Disease.

It is of great importance to attempt to estimate the duration of the disease, for it has an important bearing on treatment and economic wastage. Several factors render an exact estimate impossible. The duration of symptoms before admission to hospital is variable and often is of some years. For example, in the case depicted in Figures IV, V and VI the patient had symptoms for two and a half years before admission to hospital. The duration of hospital treatment is also variable and some of the patients admitted at the opening of the Frankston Hospital in 1930 are still inmates after six years. Mathematical precision cannot be attempted, but an average duration of the disease of five or six years is a definite understatement.

The End Result Aimed At.

The aim of all treatment of tuberculosis of the hip is to produce firm bony ankylosis of the joint with as little destruction and shortening as possible and with the hip in a good functional position.

It must be emphasized that unilateral bony ankylosis of the hip does not produce serious dysfunction. Any attempt to preserve movement at the hip must be strongly discouraged. Any hip in such a condition is a dangerous hip.

Treatment.

The great and worthy aim of treatment is to diminish disability and to convert a potential cripple into a sound, active member of the community.

Prophylaxis.

It has already been stressed that the infecting organism is of the human type of *Bacillus tuberculosis*. In 50% of cases a clear history of infection from direct contact with a case of open pulmonary tuberculosis can be obtained. In joint tuberculosis

in very young children of one or two years of age a clear history of contact can be obtained in every case.

These are important and startling facts. The usual history is of contact with a "parent just home from a sanatorium". The constant infecting factor can safely be taken as infected sputum. From a consideration of these facts emerges the vital necessity for attacking this problem at its source. That this disease and other kindred diseases, such as tuberculous meningitis, are largely preventible may be safely affirmed. Close cooperation with the public health authorities, to eliminate the possibility of contact between the tuberculous patient and the child, is of vital importance.

Conservative Treatment.

A few important aspects of general treatment may be mentioned before the local treatment is examined in more detail.

The general treatment aims at building up bodily resistance to overcome the tuberculous infection. In this regard diet, heliotherapy and the elimination of septic foci are important. Artificial stimulation of bodily resistance has not produced appreciable results at Frankston.

Local Treatment.

Local treatment may be examined under several heads.

Reduction of Deformity.—Any deformity present must be gradually and quietly eliminated by extension as a first and very necessary step. Any slight residual deformity may be corrected under anæsthesia, but violence is carefully avoided.

Absolute Rest.—It is the usual practice at the Frankston Hospital to treat tuberculous hips by immobilization in plaster. A plaster spica is applied, extending from above the umbilicus to include the foot. As a rule the sound limb is also included, and a double spica is applied. Plaster so applied has the tremendous advantage of immobilizing the diseased joint absolutely. No other form of fixation can compare with it in this important respect. The child is then nursed on a Bradford frame and can readily be turned and handled.

The use of plaster has certain disadvantages. The plaster spica necessarily protects a large area of the body's surface from heliotherapy. Efficient and long-continued extension is not easy to maintain with a plaster spica. No one form of extension can be said to be efficient over a long period. Extension is not more easily maintained with any other form of immobilization, that is, extension which prevents shortening.

The big problem in the conservative treatment is the prevention of the upward wandering of the femoral head with subsequent shortening. This has so far defied solution, and it remains the big disadvantage of conservative treatment.

The rigidity of the encasing plaster in its relation to the growth of the encased limb must be carefully considered. The plaster spica is applied, carefully moulded to the bony prominences. This does not admit of any increase in the length of the limb. If a plaster is left on for six months, an increased length of three-quarters of an inch must be accommodated. This accommodation could most easily take place by the femoral head being pushed upwards at the expense of the softened acetabulum. To obviate this possibility, all plasters should be bivalved, to permit the child to "grow out of its plaster". Further, all plasters should be changed at three-monthly intervals.

Weight-Bearing.—When the condition is considered to be passing into the fourth stage, that of repair, the substitution of a "walking spica" for the double spica may be considered. This introduces an element of weight-bearing, and this may be useful in promoting further repair.

The transition stage must be carefully watched. A rise in temperature, a fall in sedimentation curve, or the recurrence of joint pain means that the joint is not yet sufficiently repaired, and rest must be reinstituted.

This form of treatment is persisted with until bony fusion is considered firm enough for full weight-bearing, the course, as always, being followed by X ray examinations.

The Double Thomas Hip Splint.

The double Thomas hip splint has been used occasionally. It does not appear to give the absolute immobilization of the hip that is necessary. It does give a better and fuller exposure of the body to the sun, and is useful for patients who have a tender skin and pressure sores.

The End Treatment.

The patient is discharged from hospital when treatment is thought to have brought about a sufficiently firm degree of bony ankylosis. A "walking spica" may be retained or a boot built up to overcome shortening. It is at this period that most careful supervision is necessary.

End Results of Conservative Treatment.

The end result of conservative treatment is particularly difficult to express in exact terms. Many of the 63 patients are still in hospital. Some of the patients admitted in 1930 are still inmates. Of the 63 patients, 26 have been discharged, and an attempt will be made to describe the condition of these on discharge.

An analysis of 20 of these cases, conservatively treated, is shown in Table I. It will be seen that of the 20 patients, eight have developed strong bony

TABLE I.

Number of Non-operative Cases Discharged from Frankston.	Bony Ankylosis.	Presumptive Ankylosis.	No Ankylosis.	Total Known Duration of Disease till Discharge.
20	8	11	1	5 years

ankylosis; eleven have developed clinical and presumptive X ray ankylosis, but the latter could not yet be described as "strong bony ankylosis". None of these patients have relapsed, and some are still under observation. They are "probable cures". One patient had not achieved ankylosis. The patients who did not reach bony ankylosis are still in hospital or have been subjected to arthrodesis, and are included in the list of operative cases later.

It will be noticed that the average known duration of the disease till discharge from Frankston is five years. This group of cases has run the most favourable course, and therefore five years is well below the general average duration of the disease. In the later discussion on operative cases it will be noticed that five were subjected to arthrodesis on account of non-ankylosis. There were three deaths among the 63 cases at Frankston. There are also still present in hospital some patients who have not attained bony ankylosis after five years' conservative treatment. Taking these factors into consideration, it may be said, with some reserve, that the proportion of cases in which bony ankylosis is not attained after five years' conservative treatment is approximately 20%.

It will be seen from the above that bony ankylosis does occur in most cases. The end results may on the whole be considered good, but there are definitely disappointing features which may be described.

The treatment is very prolonged. "Dissolution of the joint" occurs. This is diminished in amount by efficient treatment, but is usually unpleasantly conspicuous. If this could be better controlled, the efficiency of the conservative treatment would be greatly increased. Shortening of the limb is always present, sometimes to a serious degree.

Some cases, in spite of prolonged treatment, do not exhibit bony ankylosis, and retain movement. These fall into two main groups: (*a*) those with great destruction and gross subluxation (see Figure IX); (*b*) those with fibrous union (see Figure X). This is a dangerous condition, as relapse with progressive destruction and shortening is common. It is this group which offers the best field for operative ankylosis. A fibrous ankylosis should never be accepted as an end result, but bony ankylosis should always be striven for. As will be seen later, operative fixation is of definite use in converting a fibrous union into a bony ankylosis.

The writer would like to stress the fact that conservative treatment has definite limitations and shortcomings.

Treatment of Complications.

The complications which may require treatment are: (*a*) starting pains, (*b*) abscess formation, (*c*) shortening of the limb, (*d*) renal complications, (*e*) lung tuberculosis. In regard to the last mentioned, definite evidence of some degree of lung tuberculosis has been obtained in 35% of cases. Evidence of active pulmonary tuberculosis with sputum has been rare. The figures for the 63 cases show that hilar and primary infection were present in 30% and that active lung tuberculosis was present in two cases.

Operative Treatment.

Many modern writers have emphasized the advantages to be derived from operative fixation in cases of tuberculous hip. This may be taken as a reaction against the imperfect results and the obvious shortcomings of the conservative method. Operative treatment, therefore, demands critical investigation. This would seem to be the big problem today in the treatment of tuberculous hip.

Of the 63 patients at Frankston, nine have been subjected to arthrodesis.

Operative Procedures.

Operative procedures may be subdivided into two main types: (*a*) extraarticular arthrodesis, (*b*) intraarticular arthrodesis.

Extraarticular Arthrodesis.—The extraarticular method aims at producing arthrodesis by uniting the femur to the pelvis by a bone graft without opening the joint. It has two obvious disadvantages: the arthrodesis is not firm and the graft soon fractures where it passes through non-bony structures. This is particularly liable to happen when the graft passes through inflammatory tissue. The method of Mr. Hugh Trumble, of Melbourne, passing a bone graft between the femur and ischial tuberosity, would seem to be the most satisfactory of the extraarticular procedures. The graft here is passed through tissues which are non-inflammatory.

Intraarticular Arthrodesis.—Intraarticular arthrodesis is a more extensive procedure, in that the joint is widely opened and tuberculous material is removed as widely as possible. An ileal graft is then placed between the femur and ileum.

Details of operative procedure will not be discussed, but a summary of these cases, nine in number, will be given. Of the nine patients, four were operated on by Mr. C. H. Osborn, who used Ghormley's method, two by Mr. D. O. Brown, who used the Wilson method, and three by the writer, who used Ghormley's procedure in one and extraarticular methods in two. The Ghormley method is frankly intraarticular, the joint being opened and an ileal bone graft being inlaid along the femoral neck and trochanter to the ileum. The Wilson method is more extraarticular in type, and consists in turning a fan-shaped hinged ileal graft down and over the femoral head, the flap being then fixed in the trochanter. The writer wishes to pay a special tribute to Mr. Osborn for his pioneering work in this connexion. The details of the cases are set out in Table II.

A consideration of Table II and a study of the X ray pictures reveals some important facts.

There was no mortality in this series. In only two cases was the post-operative shock described as moderate; in none was it severe.

In six cases a definite improvement was noted. This conclusion was based on serial X ray pictures

TABLE II.
Summary of Operative Cases.

Number of Case.	Duration of Disease. (Years.)	X Ray Picture.	Abscess.	Movement.	Shock.	Complications (other than Some Wound Infection).	Condition One Year after Operation.	Operative Method.
I	5	Quiescent.	No.	Yes.	No.	Nil.	Improved.	Extraarticular (Wilson).
II	3	Active.	Yes.	—	No.	Nil.	Improved.	Extraarticular.
III	4	Quiescent.	No.	Yes.	No.	Nil.	Improved.	Extraarticular (Wilson).
IV	6	Quiescent.	No.	—	Moderate.	Nil.	Improved.	Intraarticular (Ghormley).
V	3	Active.	Yes.	—	No.	Sequestra formed.	Not improved.	Extraarticular.
VI	6	Quiescent.	No.		No.	Nil.	Improved.	Intraarticular (Ghormley).
VII	3	Quiescent.	No.	—	No.	Nil.	Improved.	Intraarticular (Ghormley).
VIII	5	Active.	Yes.	—	No.	Nil.	Not improved.	Intraarticular (Ghormley).
IX	1	Active.	Yes.	—	Moderate.	Described in text.	Not improved.	Intraarticular (Ghormley).

and the subsequent clinical history. In these cases the X ray appearance was quiescent in five, and the average duration of the disease was four and a half years. Further, at operation abscess was present in only one case—deep intramuscular abscess. From this it follows that the patients who showed improvement after operation were those in the third or quiescent stage. This was evidenced by the X ray findings and the absence of abscesses. The duration of the disease at the time of operation was also four and a half years.

In three cases the subsequent course of the disease was not favourably influenced. In these cases the X ray appearance was active and destructive, and the average duration of the disease three years. Further, at operation abscess formation was present in all.

What deductions may be drawn from the above? The number of cases of arthrodesis is, of course, far too small to allow any conclusions to be drawn safely. There are certain indications which emerge, however, that may later prove to be of value in the light of further experience.

Operation in the Acute Stage.

It may safely be said that operation in the acute stage is not justified. This is disappointing, for, as mentioned previously, the active stage of the disease progresses in spite of conservative treatment, and it was hoped that operative treatment might help here.

Case IX may be considered briefly to show the particular disadvantages of operating in the acute stage.

The duration of the case was one year, and the X ray picture indicated an active condition of the disease. The operation was undertaken by the writer for two purposes, namely, to shorten the course of the disease, if possible, and to prevent joint dissolution with subsequent shortening.

At operation a sea of pus was encountered when the Smith-Petersen flap was turned down. The acetabular region and the dorsum of the ileum were so necrotic that the finger could be pushed through the bone. An arthrodesis of the Ghormley type was performed, but this was obviously unsatisfactory, owing to the conditions present. Shock was not severe, but a violent post-operative infection of the wound developed. The net results of the operation are a severe secondary infection and an exacerbation of the whole condition.

An interesting side-light on this aspect of the subject may be given. The writer had decided to operate on a group of six patients in 1935, but decided to wait until after the British Medical Association annual meeting in Melbourne in September, 1935. None of these patients were operated on, and all six have since progressed satisfactorily. It may safely be said, therefore, that there is no justification for an arthrodesing operation in the active stages.

Operation in the Quiescent Stage.

Of the six patients whose condition was improved by operation, five are seen to have been in the quiescent stage. It is of interest to note that in none of these cases were any harmful results produced. This is an interesting fact and contrasts with the results in Case IX. In some of the cases in which the patient's condition is described as improved, it is possible that the disease may have run a favourable course without operation.

Case IV would seem to be the type of case most suitable for operation.

This patient was operated on by Mr. Osborn, and the result is favourable. It will be noticed that the duration of the condition was six years, the X ray picture was quiescent, with no bony ankylosis occurring, and the whole condition was stationary. No abscess was found at operation.

The conclusion to be drawn, tentatively it is true, is that a case suitable for operation is one in which efficient conservative treatment has not produced bony ankylosis.

It may be said that operative treatment does not, and cannot, replace conservative treatment. It cannot with advantage be used in the acute stage. It may be used with advantage in some cases, carefully selected, which exhibit the following features: (*a*) no bony ankylosis after prolonged conservative treatment; (*b*) fibrous union, with perhaps some movement; (*c*) quiescent appearances on X ray examination; (*d*) probable absence of abscess formation; (*e*) approximation of the ileum and greater trochanter to facilitate the operative procedure.

SUMMARY.

1. For the positive diagnosis of tuberculosis of the hip, in the absence of biopsy or the isolation of the tubercle bacillus, two factors are necessary, namely: (i) a positive reaction to the Mantoux test, (ii) characteristic X ray changes.

2. The infection is human in type and the importance of contact is tremendous.

3. The course of the disease is cyclic and runs a characteristic course.

4. In treatment the importance of prophylaxis is stressed. Tuberculosis of the hip is largely preventible. The contact with the parent "just home from the sanatorium" is tragic.

5. Conservative treatment is the method of election.

6. This method has the following undoubted failings and disadvantages: (*a*) long duration of treatment; (*b*) progressive dissolution of the joint, which it does not control effectively; (*c*) shortening, which is always present to some extent, often very marked; (*d*) failure of ankylosis to occur in some cases.

8. The operative treatment is discussed. The only type of case in which operation should be performed is that in which prolonged and efficient conservative treatment does not produce bony ankylosis. The condition should also be stationary and quiescent.

9. Operation should never be undertaken in the acute stage.

10. Operation does not help to control or diminish "joint dissolution".

MATTI'S SPONGIOSA BONE TRANSPLANT FOR UNUNITED FRACTURES.[1]

By Thomas King, M.D., F.R.C.S., F.R.A.C.S.,
Orthopædic Surgeon, Saint Vincent's Hospital, Melbourne.

After exclusion of the well-known local, especially the mechanical, and unimportant general causes of non-union in fractures of the long bones, such as the tibia or humerus, there remains a group of cases in which the causation is unknown. There is some local loss of the power of bone regeneration. The use of skeletal traction with weights greater than two to seven pounds for fractures of the tibia and fibula is a common cause of delayed and sometimes non-union. Angulation cannot be corrected by more powerful traction with increased weights. Varus and valgus deformities, especially the latter, can generally be dealt with only in a plaster cast. With the popularity of traction methods, especially skeletal traction, over plaster splints, in recent years non-union is often seen, whilst delayed union is very common. Whilst it is correct to use twenty pounds for a fracture of the femur during the first ten days until muscle spasm and shortening have been overcome, thereafter this weight should be gradually reduced, and after three to four weeks only five pounds may be required to prevent the fractured bones from shortening or angulating; consequently there is only a short period of from seven to ten days of over-traction. Since such small weights have been used the time required for union of fractures of the femoral shaft is often reduced by one-third, that is, they often unite in about six weeks (occasionally only four weeks) instead of in nine weeks or more. Traction and shearing forces cause fibrous union, but functional pressure force (as in a walking plaster cast) favours osseous union. I have seen cases in which forty and even sixty pounds weight had been applied for traction; non-union resulted in both instances. In one case union followed immobilization in a plaster spica in which walking was carried out. In the other case a spongiosa graft was used (Case VII) after the failure of an inlay tibial graft, inserted by me. Of course, on the other hand, non-union may result from too short a period of traction. Longitudinal traction acts as the main immobilizing agent for a fractured femur, no matter what supporting splint is used. Everyone agrees that the actual splint used is unimportant. On several occasions I have used only one or two pillows upon which the limb was supported, and strapping extension was connected to a cord and weight slung over the end of the bed. Any slight angulation was easily corrected later, when union was moderately firm, by correcting straps attached to the side bars of the Thomas walking caliper.

Fractures of the tibial shaft are common and so consequently is non-union. Delayed union is, however, very common, even when perfect treatment has been instituted from the beginning. Three to six months are frequently required for firm osseous union. Consequently simple transverse fractures may fail to unite because the immobilization has been inadequate, but may respond to the pressure stimulus stressed by Roux, and more recently by Pauwels, which can be obtained by the walking plaster cast or even a caliper. If this fails, multiple subcutaneous bone drilling (Beck) often succeeds if diligently performed. Unfortunately this good and simple method cannot safely be used without open operation in the treatment of bones surrounded by important blood vessels and nerves, such as the humerus, radius or femur. Since open operation must be performed in these cases, we can then be much surer of obtaining osseous union by a freshening and grafting operation. Unfortunately massive bone grafts sometimes fail, especially in the tibia and forearm bones. That a bone transplant succeeds so often is rather remarkable, because the establishment of a new blood and lymphatic circulation in the new bone from the surrounding tissues must be a matter of weeks. Therefore some parts of the graft may die (cortical bone) and other parts (spongiosa) survive, and this seems to be the answer to the evergreen conundrum: "What happens to the bone transplant?" That portion or whole of a bone transplant survives can be proved by biopsy and X ray examinations; and Matti has produced very convincing experimental evidence of this. When a series of X ray pictures show a firmly united bone graft retaining its original form and firmly united, we can conclude

[1] Read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

ILLUSTRATIONS TO THE ARTICLE BY DR. J. G. WHITAKER.

FIGURE I.
From patient J.P., showing first of three stages occupying three years.

FIGURE II.
From patient J.P., showing second of three stages occupying three years.

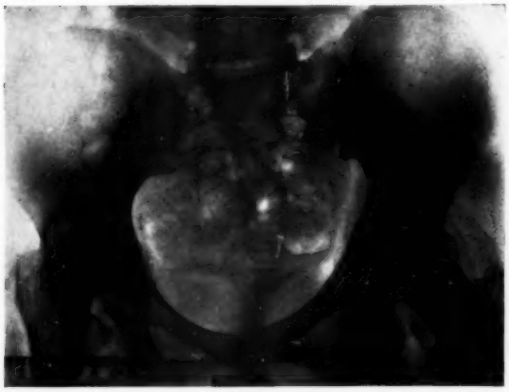

FIGURE III.
From patient J.P., showing third of three stages occupying three years.

FIGURE IV.
From patient M.H., showing first of three stages occupying three years.

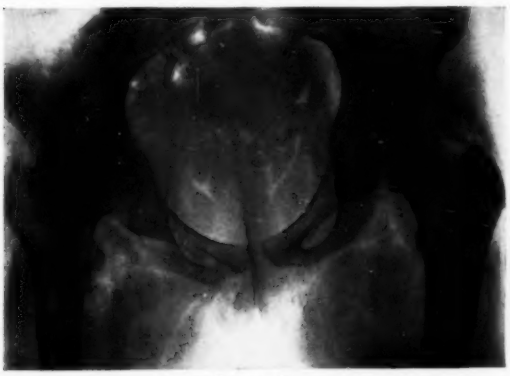

FIGURE V.
From patient M.H., showing second of three stages occupying three years.

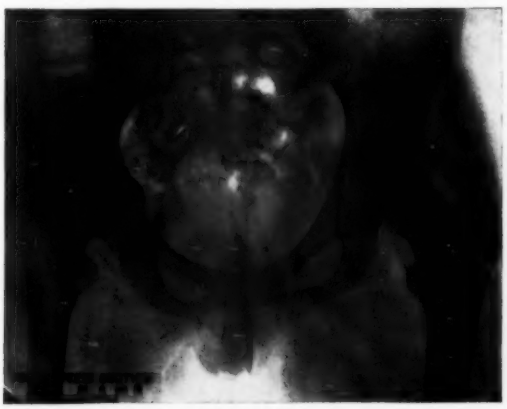

FIGURE VI.
From patient M.H., showing third of three stages occupying three years.

ILLUSTRATIONS TO THE ARTICLE BY DR. J. G. WHITAKER.

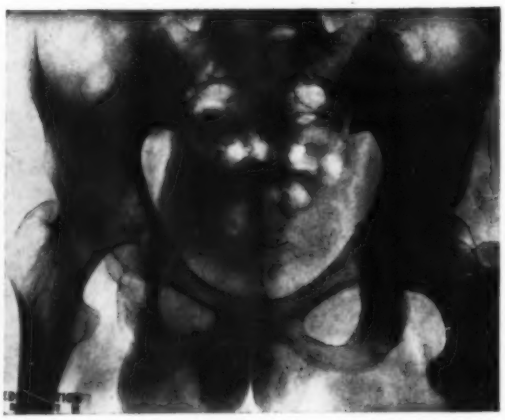

FIGURE VII.
From patient B.S., showing repair. Four years' duration.

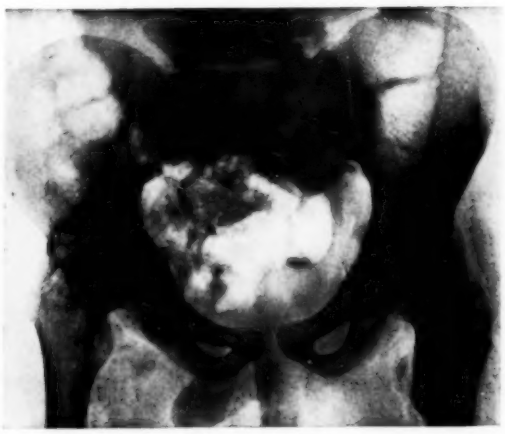

FIGURE VIII.
From patient R.O., showing repair. Four years' duration.

FIGURE IX.
From patient L.A., showing gross subluxation and no ankylosis after seven years.

FIGURE X.
From patient J.K., showing fibrous union with deformity after nine years. Suitable for arthrodesis.

FIGURE XI.
Operative Case IX. One year's duration. Before operation (Ghormley method).

FIGURE XII.
Operative Case IX. After operation (Ghormley method).

ILLUSTRATIONS TO THE ARTICLE BY DR. J. G. WHITAKER.

FIGURE XIII.
Operative Case I. Five years' duration. Before operation (Wilson method).

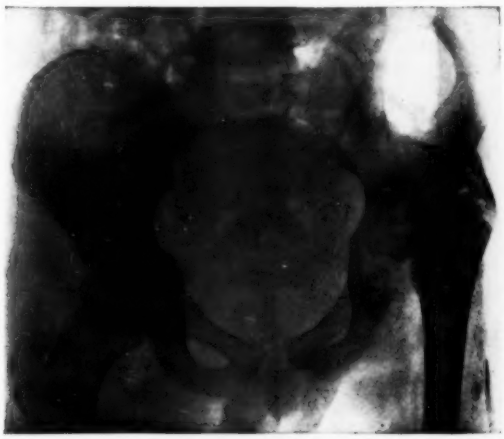

FIGURE XIV.
Operative Case I. After operation (Wilson method).

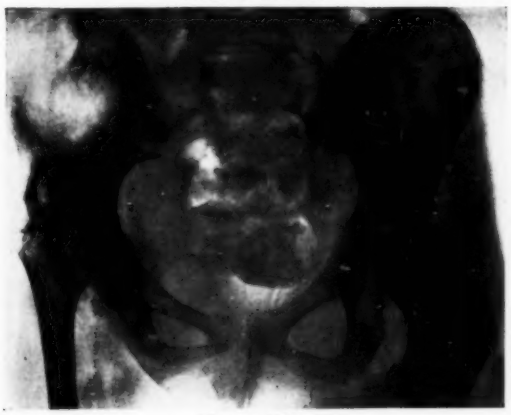

FIGURE XV.
Operative Case IV. Six years' duration. Before operation (Ghormley method).

FIGURE XVI.
Operative Case IV. After operation (Ghormley method).

ILLUSTRATIONS TO THE ARTICLE BY DR. THOMAS KING.

FIGURE X.
Case I. Pseudarthrosis of tibia of six months' duration, November 30, 1936.

FIGURE XI.
Case I. Same case as Figure X on February 4, 1937, two months after operation on December 2, 1936. Firm osseous union present.

FIGURE XII.
Case I. Same case as Figures X and XI on March 22, 1937. Patient walks with no support.

ILLUSTRATIONS TO THE ARTICLE BY DR. THOMAS KING.

FIGURE XIII.

FIGURE XIV.

FIGURE XV.

FIGURE XVI.

FIGURE XVII.

FIGURE XIII.

Case II. X ray appearances on December 5, 1936, showing failure of drilling in fifteen-months-old fracture. Bone peg insertion performed on July 29, 1936. (Compare with Figure IX.)

FIGURE XIV.

Case II. Same case as Figure XIII on April 9, 1937, two months after operation on February 10, 1937.

FIGURE XV.

Case II. Same case as Figures XIII and XIV on August 6, 1937. Patient walks without support.

FIGURE XVI.

Case VI (July 23, 1937) only four months after a severely infected and suppurating compound fracture of humerus. Wound healed two months, but non-union.

FIGURE XVII.

Case VI. Same case as Figure XV on September 13, 1937, only six weeks after operation on July 31, 1937. Firm osseous union present. No splinting.

that the bone did not die any more than the successfully nailed and osseously united *caput femoris* dies. The latter retains its form and is an autoplastic bone transplant (Murphy). That it sometimes degenerates later is another problem altogether. Sometimes the opportunity is presented of examining the bone transplant at a second operation, at autopsy, or on exposure of the grafted fracture site due to sloughing of the skin (in one case the skin was burnt by infra-red and ultra-violet light in a hypersensitive person nearly three months after the operation). One often sees then that the spongiosa surface of the transplant is firmly united and must be alive, but we cannot say whether the cortical bone is alive. It is insensitive, does not bleed, but it is not sclerosed. The most important part of the solid graft is the thick layer of the spongiosa which should accompany a well-cut tibial transplant. Not only does the open cancellous bone permit of the easy ingrowth of a new circulation from the surrounding bed, but it probably contains hormones, the enzyme phosphatase

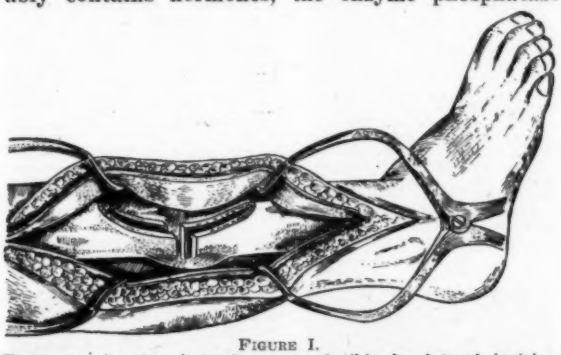

FIGURE I.

Exposure of antero-lateral aspect of tibia by lateral incision directly onto bone without any individual separation of skin, muscular or periosteal planes, which prejudices the blood supply. Slices of bone from the antero-lateral aspect of the tibia have been removed until the medullary cavities of both fragments were opened and bled freely. The fibrous tissue between bone ends has been removed, except for a part which acts as a bridge or hinge holding the bone ends. An extensive exposure of the bone, except at the pseudarthrosis, is avoided.

or some unknown physiological properties which stimulate the local formation of bone. The soundest abstract reason for the survival of the transplanted bone is the fact that it unites or is united with the fractured ununited bones which were themselves incapable of uniting or refused to unite, but as a result of the graft now proceed to unite with one another. Since the old fracture has failed to unite because the fractured bones for some unknown physiological reason are incapable of it, it is unreasonable to propose that these two ununited bones are capable of ossifying the graft, which according to this view acts only as a scaffolding. If this proposition is true, it is regrettable that the fractured bone ends do not apply this ossifying power with more physiological reason, in order to produce that very desirable union with one another instead of waiting until an avascular piece of apparently dead bone bridges the fractured bone ends. The lack of blood supply to one or both bone ends at the site of fracture is realized as an important cause of non-union. If this is so, how can we expect the superadded presence of a completely avascular solid piece of transplanted bone to become vascularized, slowly absorbed, and then act as a mere scaffolding for the subsequent development of new bone? This presumption assumes an excellent local blood supply, which cannot be present at the fracture site if avascularity is really the cause of non-union in every case. Of course, there are cases in which the blood supply is adequate, but union does not take place. I believe the graft is alive in its main mass of bone cells, and remains alive, and that the fresh

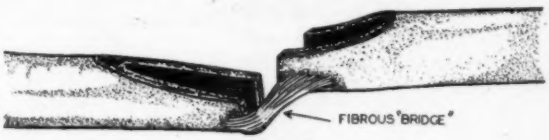

FIGURE II.

The medullary cavities of both bones have been thoroughly curetted. This excochleation of the bone marrow stimulates osteogenesis (Matti). Note the fibrous bridge which prevents displacements.

transplanted bone brings some ossifying power with it. This may be a living enzyme, but whatever it is, it brings with it a revivifying power to the affected bones. If this view is correct, the graft in the main must live, otherwise the enzyme (let us suppose) would not remain long enough to act on the bones and to produce osseous union. The remarkably rapid osseous union which follows the implantation of the spongiosa transplant of bone suggests that in the bone marrow and medullary cavity there is contained an abundance of this bone-stimulating substance. On the other hand, the many failures with the grafts containing mainly cortical bone suggest that dense bone does not. According to this view transplants of the tibial crest, inner

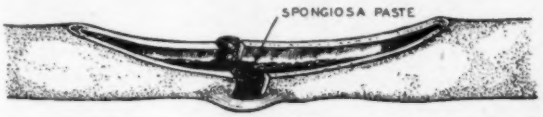

FIGURE III.

Spongiosa obtained from the great trochanter or upper end of tibia (not so good) is packed as a plastic bone paste into the excochleated medullary cavities of the bones.

surface of the tibia or shallow grafts cut with a chisel alone are very inferior to those cut with a deep circular saw and subsequently deepened with a thin, very broad chisel (Figure VIII, D and E).

The cortical bone is important mainly as an internal splint. In 1926 Matti first used spongiosa for a pseudarthrosis of the radius, but without success. In 1931 he published a paper, which has not received much attention, on the free transplant of bone spongiosa (although in the last "Medical Annual" Professor Hey Groves has drawn attention to this method) and described a careful series of experiments in animals. Matti was attempting to discover whether transplanted bone lived or died before it was incorporated with the bone of the

host. He used spongiosa because it was easily vascularized, and he obtained it from the great trochanter and the pelvic crest. He followed Marchand, who considered that the only way to discover whether bone is absolutely alive or dead is the microscopic examination of stained preparations, as dead bone cells do not stain according to

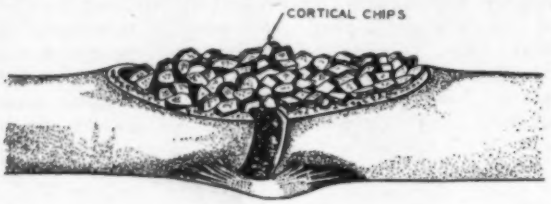

Figure IV.

Bone chips obtained by cutting up the cortical bone removed from the fractured bones are packed loosely on top of the cancellous or spongiosa transplant.

this method. Matti resected a dog's rib subperiosteally and then sewed up the periosteal tube; but in another he filled it up with a plastic bone paste made from the spongiosa or cancellous bone. In the latter case new and stronger bone was quickly formed. He also noted that a very rapid formation of bone developed in the cancellous cavity of the great trochanter from which the spongiosa was obtained. This important observation that very active bone regeneration took place in the endosteal cavity from which cancellous bone had been removed, proves that spongiosa was very active.

Figure V.

This is the same case as shown in Figures XIII, XIV and XV. Note the incision over the great trochanter from which spongiosa or cancellous bone was obtained.

From time to time pieces of the spongiosa transplant in the periosteal tube (rib) were removed, stained and examined microscopically, and were found to be living. As a result Matti did not support the dogma that the autoplastic free bone transplant dies in the main mass (unless large compact pieces of bone are transplanted in an unsuitable bed). Tibial transplants, if cut properly from the upper part of the tibia, where there is much cancellous bone, have a lot of spongiosa attached to them, and this surface is always clamped onto the fractured bones. In the case of ununited fractures of the femoral neck treated by a fibular peg we reverse the process and place solid bone in a bed of cancellous bone. Therefore, on account of the spongiosa bed, the solid fibula is preferable

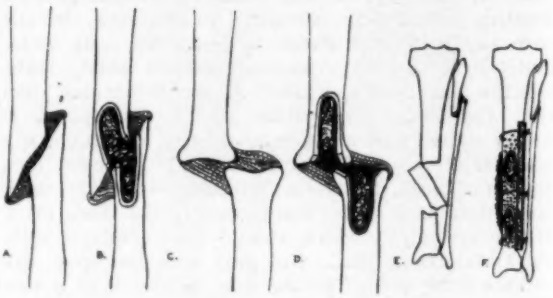

Figure VI.

Diagrams indicating methods of dealing with various displacements. A: Ununited oblique fracture with lateral displacement. B: A deep and broad gutter has been cut in both fragments which now communicate by their medullary cavities. Lateral displacement is ignored. C: Pseudarthrosis in a transverse laterally displaced fracture. D: Without interference with the displacement a communicating gutter across the pseudarthrosis is cut in both bones. E: Comminuted fracture of tibia (ununited). F: The comminuted fragment was replaced, guttered at both ends so that there it communicated with medullary cavities of both ends of the tibia and packed with spongiosa paste. Numerous drill holes in the fragments. Thick lay-on tibial transplant with a half-inch layer of cancellous bone clinging to cortical part of graft. Oblique fibula osteotomy to correct shortening. In most cases with a transverse or oblique fracture of the tibia the fibula, even if united, can be ignored.

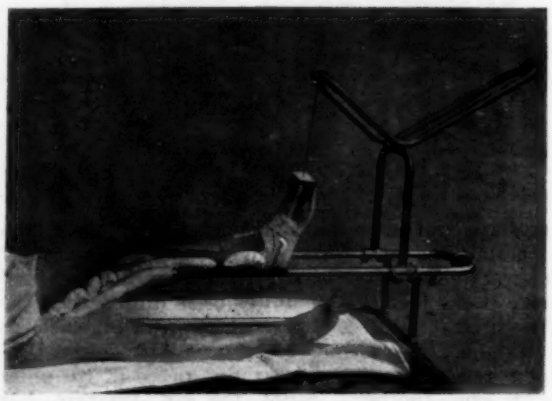

Figure VII.

After operations on the lower extremity the limb is suspended in a Braun splint. After operations on the tibia encasement in a plaster cast under seven to fourteen days is dangerous, even if padded. The case illustrated is a simple fracture of the tibia and fibula. Had a plaster cast been applied, it would have been blamed for the "fracture blisters" and swelling.

by far to a tibial peg which is weak, containing only a thin layer of cortical bone and a large amount of cancellous bone, and which therefore is absorbed too quickly. The use of the pelvic crest, which contains much spongiosa, was very successful during the War in repairing the osseous defects in old compound injuries of the lower jaw.

Matti's procedure is as follows. The skin incision passes directly right down onto the bone, undercutting and elevation of muscles, skin *et cetera*, which prejudice the subsequent vascularization of the bone, being thereby avoided. Then the skin, muscles and periosteum *en masse* are raised from the bone over the old fracture, but only in front after a lateral skin incision for the tibia or for the femur from the outer side. Skin flaps are not undercut, nor is there an encircling stripping up of the bones. Only the minimal baring of the bone on one aspect should be performed, and in no circumstances should the bones be forced out through the incision. Now the front surface of the bone in the case of the tibia is sliced with a large flat chisel longitudinally until bone marrow is seen and the bone both proximal and distal to the pseudarthrosis bleeds freely. The bone marrow and medullary cavities are opened until they bleed freely. Therefore no tourniquet should be used. A large broad area of non-sclerosed but healthy bleeding bone is exposed thereby, without any loss of length in the limb, which always occurs when the ends are sawn off until bleeding bone is exposed, as in the orthodox methods. The medullary cavity, which has been exposed, is thoroughly cleaned out with a sharp spoon. This removal of the bone marrow stimulates osteogenesis in the cavity remaining. All removed cortical bone is kept for use later. Then the pseudarthrosis or fibrous tissue is cut out with a knife, except for a bridge of tissue which is left. This bridge must be left,

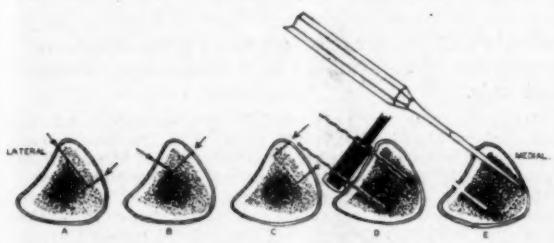

FIGURE VIII.

In cutting a tibial transplant a thick layer of spongiosa should be removed with the cortical bone. It is easier to do this with a circular saw than a chisel alone. A: Transplant removed from medial aspect of tibia, containing very little spongiosa—poor graft. B: Graft obtained from tibial crest. It is easy to remove with a chisel, but is poor in spongiosa. C: Shallow graft cut from medial aspect of tibia, where the bone is avascular; a poor transplant is obtained. D: A good thick transplant cut from the lateral aspect of the tibia with a circular saw of wide diameter. E: Same transplant as D, but deepened still more with a very broad-surfaced but thin-bladed chisel. A good transplant with a broad layer of cancellous bone clinging to the cortex is thereby obtained.

as it holds the two fragments together like a hinge. Except for this bridge, a gap now exists at the fracture site. If marked lateral displacement is present, no bridge can be left (see Figures XVI and XVII) and then the two ends are held together by a loop of Krupp V.2.A rustless steel wire, which is passed through a drill hole in each fragment. If there is lateral displacement, as shown in Figure VI, C and D, provided it is not greater than the diameter of the shafts of the bones, it is ignored. So long as there is neither angulation nor axial torsion (all of which are easily controlled later by splinting) perfect function should follow osseous union with parallel fragments, which are not end to end. With oblique fractures (see Figure VI, A and B) the saucer or groove is cut in a similar manner and the displacement is ignored. Any attempts at operative realignment are harmful, because they necessitate an extensive stripping off of vascular, muscular and periosteal attachments. A trap-door or plug of bone the size of a shilling piece is cut from the lateral aspect of the great trochanter through a lateral incision. This operation for obtaining the spongiosa should always be

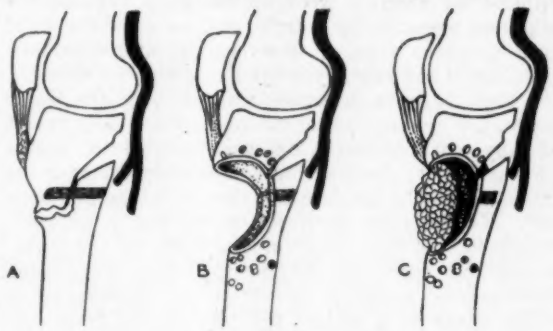

FIGURE IX.

Diagrams corresponding to X ray pictures Figures XIII, XIV and XV. A: Bad pseudarthrosis of tibia in a difficult part to operate upon, because of the knee joint above and in front and popliteal artery posteriorly. The first operation, of Becks's multiple drilling and bone peg, was a failure. B: Same case after guttering and excochleation of medullary cavity; note numerous large drill holes. C: Same case after packing in the spongiosa plastic paste and bone chips.

performed before the operation on the pseudarthrosis. If a smaller opening is made, there is no need to replace the bone plug. The bone is obtained from the trochanter proximal to the lateral tuberosity of the *vastus externus* (trochanteric tubercle) below which the Smith-Petersen nail is always inserted. There is sufficient cancellous bone in the trochanter itself, and it is not necessary to curette the neck of the femur, from which no bone should be scraped out, otherwise the neck may be weakened. A broad area of easily scraped out red spongiosa is thereby exposed. At least two dessertspoonfuls of this material are scraped out and put aside, together with the blood and fatty fluid. The trap-door or plug of cortical bone is replaced. The tibial tuberosities are also sources of this material, but the spongiosa there is seldom in sufficient amount, and it is yellow instead of red. When, however, a tibial graft is being used, it is convenient to supplement it with spongiosa scraped out from the head of the tibia through the upper end of the bed from which the graft was removed. The spongiosa, blood and fatty fluid are now packed into the cavity, and particularly between the two edges of the fractured bones. The spongiosa stops all bleeding and should be hammered in gently with the handle end of the chisel until it forms a packing paste.

Note that the spongiosa transplant acts effectively only when the medullary cavity of the fractured bones has been scraped out first. All the previously chiselled out cortical dense bone is chopped up into pieces the size of wheat grains and packed in rather loosely on top of the spongiosa transplant. There is always abundant material. The spongiosa alone is insufficient in quantity to fill up the cavity. A few sutures hold the surrounding muscles over the transplanted bone. Then the skin is loosely sutured to allow of blood and serum draining. A stab drain tube for twenty-four hours is essential in order to avoid a hæmatoma. A lower limb is placed on a Braun splint. Plaster casts are never applied for about a week or ten days, because the slightest pressure by a tight cast or even the local skin pressure from a blood-soaked and hardened padding in the cast, by prejudicing the nutrition of the limb, favours infection. Rotation of the leg is prevented by suspending the foot. Note the absence of any constriction whatever in such a splint (Figure VII). No traction is necessary even for the femur as a rule, because the fibrous bridge has been left. If angulation developed in the femur, adhesive strapping on the leg from the knee to the ankle would be sufficient to correct the angulation. Tremendous swelling and fracture blisters sometimes occur in a simple fracture of the tibia and fibula, and if this leg were encased in a cast, even though padded, trouble would arise and the plaster cast would be blamed for the blisters. Operated limbs also show much swelling later. For the humerus the limb merely rests on a pillow for fourteen days and thereafter is suspended by a collar and cuff sling with plaster splints to protect the humerus. In the case of the forearm bones the whole limb is supported on well-padded Cramer splinting and later the plaster splints are applied.

The advantages of the method are the following:

1. There is moderate disturbance of the surrounding tissues with consequent minimal disturbance of the blood supply to the ends of the bones.

2. The retention of the small bridge of fibrous tissue avoids displacements, and splinting is used only to prevent angulation. Even should the operation fail the patient will not be any worse off.

3. No loss in length of the limb occurs because the bone is "saucerized" and the ends of the bones are not cut off. The fibula has not to be divided in the case of an ununited tibia.

4. Experimental and clinical experience shows that scraping out the medullary cavity of the fractured bones near the pseudarthrosis stimulates bone formation.

5. Spongiosa is very easy to obtain (no electric saw is necessary) and it is easily vascularized when transplanted, besides containing some unknown osteogenic stimulating substance.

6. The presence of infection either before or after operation is not fatal to success, although some of the cortical chips will be discharged. Matti has operated in the presence of chronic streptococcal infection.

7. Union is very quick; for example, eight weeks for the tibia.

Case Histories.

The following are my experiences in seven cases, five of which are completed:

CASE I (Figures X, XI and XII) was one of non-union of the tibia of six months' duration. This case was unsuitable for Becks's multiple drilling, because the non-union was not fibrous, but due to a pseudarthrosis; this was shown in the X ray picture by sclerosed bone ends and a translucent gap between them. Guttering and the insertion of a spongiosa transplant were performed on December 2, 1936. Firm osseous union was present two months later, on February 4, 1937. The patient was walking with no splint on March 2, 1937, that is, three months after operation.

CASE II (Figures XIII, XIV, XV) was one of bad pseudarthrosis (fifteen months old) in a part of the tibia difficult to deal with because the obliquity of the fractured surface terminated in the popliteal fossa, whilst the synovial cavity of the knee joint was above and in front, also the *ligamentum patellæ*. A previous operation on July 29, 1936, by myself, of drilling the fragments (Beck) and inserting two bone pegs, was a failure. On February 10, 1937, I dealt with the case, as shown in Figure IX. Two months after operation the union was firm, and on August 6, 1937, the patient could walk without support.

I doubt whether this fracture could have been effectively dealt with by any other method. Yet by this method the operation is easy. The wound was loosely sutured and a large blood exudate developed. Slight infection was present, but caused no harm. I believe the slightest constriction even in a padded cast might have precipitated a severe infection. The elevation on the Braun splint, with prevention of rotation by foot suspension, is simple and safe.

CASE III was one of painful pseudarthrosis of the *manubrium sterni*, the result of an old fracture. This had been diagnosed as tuberculous disease of the sternum. Two months after saucerization of the pseudarthrosis and packing with spongiosa from the great trochanter firm osseous union resulted. A large bone formation developed with disappearance of the painful pseudarthrosis.

CASE IV was one of comminuted accidental fracture of the tibia with displacement following removal of a piece of the fibula for the pegging of an old femoral neck fracture performed by me. Very slight chronic infection of the wound and a small sinus were present.

The method adopted in this case (Figure VI, E and F) was as follows:

1. A large lay-on tibial graft was prepared from the opposite tibia. The rustless steel V.2.A Krupp wire is strong, and even in the presence of infection has no reaction in the tissues. It need be removed only if the twists are irritating the skin. For bone fixation it is superior to all other ligature materials.

2. The middle fragment is lashed to the tibial transplant, which has a maximum amount of cancellous bone clinging to it because it was cut from the upper half of the tibia. Note the saucerization at the two fracture sites. The spongiosa obtained from the upper end of the tibia was packed into these cavities and all around the bone here. The

fractured fragments, against which the tibial transplant was clamped, were roughened and drilled in numerous places. Despite the occurrence of a very severe septic infection, a firm osseous union resulted after three months. Then one day, following a twist, the tibia broke again. I have removed two sequestra, and the X ray appearances suggest that osseous union is very likely to occur again.

Case V was one of fracture of the tibia and fibula of one year's duration, for which a bone drilling and then an inlay transplant failed. Two months after guttering and a spongiosa transplant operation of Matti on April 20, 1936, the leg was moderately firm, and X ray examination showed a massive formation of bone on June 18, 1936. A walking iron and correction strap were then ordered to correct some lateral bowing; on October 29, 1937, the patient is still wearing a splint and the leg is firmer and improving.

Case VI (Figures XVI and XVII) is that of a patient who was operated upon on June 31, 1937, for non-union of the humerus due to a compound fracture sustained on March 19, 1937. A tremendous suppurative limb resulted from the accident. The wound had healed under the influence of ultra-violet light about two months when I performed Matti's spongiosa transplant operation. There was a wide separation of the fragments, which I held together with a loop of wire. The wound healed by first intention. Six weeks later there was firm osseous union. On October 13, 1937, I performed a tenoplasty for a radial nerve paralysis, as in operating on the humerus I found the radial nerve was destroyed by a fibrocicatricial intraneural degeneration, the result of partial tearing and subsequent inflammation of the nerve at the time of the accident. Finger movements are almost normal.

Case VII.—This case of an ununited fracture of the femur is too early to report, as operation was performed on October 20, 1937. One year before, I performed a well-fitting inlay graft operation, but the bones failed to unite, although the two ends of the femur had an excellent blood supply and bled freely.

Conclusion.

I believe that the method of using the spongiosa, cancellous bone or bone marrow according to the technique described is the simplest and most certain method of obtaining osseous union whenever a bone transplant for non-union is necessary. I have used it in three cases in which drilling and inlay tibial transplants had failed. It is especially valuable as infection does not necessarily spell failure. Occasionally the method of transplanting the bone marrow may be supplemented by a thick tibial graft cut with a very wide diameter circular saw and carefully removed so that about half an inch of cancellous bone clings to the cortex. Furthermore, the two fractured fragments should be extensively drilled with a quarter-inch or three-sixteenth-inch drill. Some of the drill holes should be on the surface of the bones against which the tibial transplant is to be clamped. The tibial transplant should be half the length of the ununited bone. In order to apply such a long transplant to the fractured bone it is undesirable to expose the whole bone. The upper and lower ends of the fractured bone can be made raw on the part to which the transplant is to be applied by tunnelling under the muscles and then scraping the unexposed bone with a file or very sharp chisel.

Acknowledgement.

I wish to thank Dr. J. B. Colquhoun, F.R.C.S., of Melbourne, for reading this paper at the meeting of the Section of Orthopædic Surgery at the Australasian Medical Congress in Adelaide.

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SURGERY IN THE AGED AND DEBILITATED.[1]

By John Kennedy,
Melbourne.

Although I have been asked to write a paper on surgery in the aged, I desire to amend the title and discuss some of the problems, not necessarily in the aged, but in the debilitated. Quite fair operation risks are met with in the late sixties, and very poor risks at times in middle life or in the forties. Hence I wish to consider these as belonging to the one group, as the same difficulties apply to both: the patient who requires quite a complicated operation to relieve him, but who is fit for only the simplest possible procedure.

In emergency surgery this is not difficult. Relief of the complication which is about to destroy the patient as a rule entails a perfectly simple operation, for example, to drain the bowel, bladder, or abscess, or to suture a perforation; and this operation can be carried out anywhere even by a casual surgeon, and is life-saving. When, however, one is faced with the necessity of removing the causal lesion the problem is of a different order and may be quite insurmountable. It is to a consideration of some of these difficulties, and the means of dealing with them, the failures and successes, that I wish to direct your attention.

I propose in the first place to discuss the main general considerations which can be applied to cases of this type. These are: preparation (apart from special treatment, such as in the prostate) for the ordeal of operation; anæsthesia; and main principles of operation. Later I would present to you, more in detail, methods as applied to the stomach, colon, gall-bladder and simple enlarged prostate.

The Preparation of the Patient.

In preparation of such a patient I think it wise that he should be in hospital at least a week prior to operation. It is assumed that the mouth and

[1] Read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

upper air pasages are clear, or have been dealt with prior to admission. Chest complications are the bugbear of the aged, and part of this risk can be avoided at the outset by attention to these details early; most of one's failures are caused by lung complications, and I think can be minimized by careful preparation. The foul mouth is cleaned up; all so-called catarrh cannot be cured, but recent infection means further delay and later special anæsthetic consideration. Renal and bowel functions can be determined and improved by dieting and *plus* fluids, the latter being of great importance; bodily and mental rest and regulated sleep are assured; warmth and freedom from exposure to draught are of great importance.

I teach in my wards that health rules about free draught ventilation do not apply to the debilitated or aged patient; the warm corner of the ward is the place for him, not the bed between the door and window. He needs to be handled as carefully as a baby.

Anæsthesia.

With the improvement in anæsthesia in recent years much of our success in operation must be attributed not to our technical skill, but to the poorly paid, essential, patient and careful man at the head of the table. The days of chloroform, in which many of us were trained, are far behind; now ether given by the open method is in the background, and the new era of gas and oxygen is a milestone in the progress which the anæsthetist has made. Spinal anæsthesia may be valuable, but in my experienec is not devoid of risk; the fall in blood pressure, which I have been unable to avoid, has been responsible, I think, for the later renal failure in some cases. Sacral anæsthesia has not been quite satisfactory in my hands, and was abandoned after a few failures.

Local anæsthesia, with adequate premedication by scopolamine, the barbiturates or paraldehyde (in that order) is, I think, most reliable, not only from its control of shock to the patient, but because of its control over the surgeon. It lends itself well to the simple straight operation, which these patients can tolerate, such as drainage or removal of the "easy gall-bladder" or common duct stone, an anastomosis or bowel drainage; but it is not easy to manage in the difficult, more complicated procedure. It has another great virtue: it entails very careful handling of the tissues and organs on the part of the surgeon; the patient in a sense controls the operation. It removes the temptation to do the little more which completes the operation, but adds another to the failures.

"Novocain", with its ease of preparation, sterilization, and low toxicity, has been most satisfactory. I prefer, in regional anæsthesia, to be able to use large quantities of this weak solution rather than smaller quantities of the more potent drugs. In intraperitoneal work long strips of gauze soaked in a warm 2% solution as packs around the operation field materially aid the anæsthesia. In preoperation medication, paraldehyde has been extensively used in recent years; but two elderly patients with stomach conditions died of acute pulmonary œdema soon after the operation; for this I blamed that drug, so gave up its use in such patients. The barbiturates are uncertain in their action; but scopolamine has been very reliable, though even in this case one occasionally finds the patient with a morphine idiosyncrasy.

Thus in this class of surgery one's choice lies as a rule between gas and oxygen and local anæsthesia. The latter is used for the thin, pulmonary or cardiac patient; the former for the stout, strong or nervy type of individual.

Transport to and from the Theatre.

Although it seems absurd to suggest the necessity for care in handling these old people, one would draw attention to this important aspect of the operation. Childhood and old age have this in common: both are very sensitive to cold, exposure and discomfort. The cold corridor, the long wait in the anæsthetic room, the cold, hard operation table and paucity of blankets are all things to be avoided.

Consideration of Operation.

Complete and thorough investigation clinically and otherwise to obtain, as far as possible, an absolutely accurate diagnosis of the condition is essential. It is not sufficient to know that cholecystitis is present; further investigation of the whole alimentary tract is necessary; and the danger of the presence of other lesions increases with age. The general condition, particularly of the other systems, such as the respiratory, the cardio-vascular and the renal, as well as the presence or otherwise of constitutional disease, such as diabetes *et cetera*, must be accurately determined. Only when this information is available can one proceed to plan the operation or mode of attack. In younger patients the whole plan can be altered on opening the abdomen; in these patients this may mean failure. In one it is easy to change from the gall-bladder to the gastric ulcer or from the uterine or ovarian to the alimentary lesion; but this may be fatal in the aged.

In planning the operation one must never forget that whilst simple uncomplicated procedures are safe, difficult, prolonged operations are dangerous and a mishap may be fatal. Length of operating time is a factor, but I think of greater importance is the care and gentleness with which the manhandling is carried out. One of the most successful surgeons in this class of work (Mr. R. C. Brown) was slow, but very careful and light-handed. He would take two hours on an operation which most men would finish easily under the hour; yet in patients of this type he had remarkable success in stomach and gall-bladder surgery.

The more difficult abdominal operations can be split up into stages or a series of simple procedures,

and the mode of attack can be carefully laid down in this manner and as carefully carried out. There is always the temptation to extend its scope and do the "little more" and to save at least one stage in the work. This, I think, is greater with gas and oxygen than with other forms of anæsthesia. The patient is so well at the end of the simple operation that the surgeon thinks that more can be done; and a failing circulation finds him with a half-completed operation. One looks back on the gall-bladder which should have been left behind, the breast which required local excision only, the gastric resection, the colon excision which should have had anastomosis and drainage only—all failures through trying to do the "little more" which seemed so easy, and to complete the operation.

Most of the alimentary tract lesions in these cases are chronic, inflammatory or neoplastic, and the operative treatment can be easily staged. In rectal and colonic conditions the first stage is abdominal exploration and colostomy, followed later by resection, in one or two stages in the rectum and pelvic colon; then final closure of the colostomy is made. In all there are three or four stages, none of which will throw too great a strain on the patient. Compare this with the early single-stage resection. In 1913, during my term as house surgeon at Saint Mark's Hospital, out of sixteen patients subjected to abdomino-perineal operations, only one recovered. The actual operative technique was as perfect as one will see today.

Similarly, in other parts of the large bowel extensive straight resections are not well tolerated by any patient, old or young. The simple Mikulicz operation, which leaves the glands behind, is useful only in special cases. It is better first to perform preliminary colostomy and then to separate the gland-bearing area, leaving it intact outside the abdomen; thirdly, to perform the Mikulicz anastomosis, and finally the closure. All are short stages. Two general anæsthetics are required, and for the other local anæsthesia is used, in the patient's bed if necessary.

Gall-Bladder Surgery.

In gall-bladder operations the Mayo-Robson incision is easier to make, less time-consuming, less bloody and easier to close than the paramedian or Kocher incisions. Herniæ rarely occur in the aged. The one objection to the Mayo-Robson incision is the paralysis of the inner section of the rectus muscle, which is of little significance in this class of patient. In cholecystitis, when there is no evidence of duct involvement, simple evacuation and drainage of the gall-bladder will give all the relief required without undue risk. Statistics of equal mortalities apply to the younger good risk patients, not to the aged or debilitated. The resection or cholecystectomy in many of these cases is an operation of some magnitude.

The gall-bladder is thickened, friable and densely adherent to the liver, and its stripping is difficult and associated with quite considerable bleeding and possible liver damage. It is this condition, so often met with in the aged, that, I think, should be treated by conservative means — by cleaning out and drainage and not by resection. Occasionally the gall-bladder is thin-walled, with few adhesions, strips easily, and presents no more difficulty to the experienced surgeon than a simple appendicectomy. This class of case can be dealt with in the orthodox manner.

In stones in the common duct search for the stone at once; get it out; clear the ducts and leave the gall-bladder for another day; or it is the wise rule to empty and drain it.

It is the "little extra" that injures the patient in these cases. We must think not only of the patients who die; there are the others who are so badly knocked out that the fight begins only after the operation is over—those who suffer from circulatory collapse, pneumonia, heart failure, liver failure, subphrenic or liver sepsis which follows the handling and prolonged operation.

The Prostate.

There is another common disease of the old man—the enlarged prostate with obstruction. A great deal has been written about this subject and a great deal more will follow; and in a few years' time our present methods will be antiquated and other simple means will be found for dealing with this condition. The patients have ranged from the middle fifties to ninety years of age; some have been perfect risks; others have been deblitated with other diseased conditions, heart failure, lung conditions, advanced rheumatoid arthritis, nerve conditions, diabetes *et cetera*; but there is one thing that they must have, and that is a potential and moderately good renal efficiency. If their renal efficiency is not good I make a suprapubic puncture, form a fistula, and leave them with a permanent tube and spiggot until the function of the kidneys improves. It is extraordinary how comfortable and clean such patients can keep themselves with the simple tube. One patient waited two years before he was considered fit for prostatectomy.

The two great operative risks in these selected cases in my experience are hæmorrhage and sepsis. The latter has almost disappeared since I gave up pre-operative urethral drainage and adopted suprapubic puncture, the former by judicious use of the Pilcher's bag, sometimes aided by suture and ligature of vessels in the bladder neck. The Harris operation, I think, is an excellent procedure in selected cases, but I am quite sure that the debilitated old man, whose operation must be completed in twenty minutes, with no blood loss, requires a more skilful hand than mine to carry it out. The house surgeon, who had had ten cases without a complication, compared the two when I had selected a case for the Harris technique with the following: "Please don't, sir! You put a bag in and I can go to bed; but the other fellows are up all night with their cases."

Simple and Malignant Ulceration of the Stomach.

Patients with simple and malignant ulceration of the stomach are often very debilitated and are poor operation risks for any form of procedure. The middle-aged or older good risk patient will tolerate the complete one-stage resection in this part of the tract far better than a similar procedure lower down. A debilitated, half-starved old man will often not even stand an anastomosis. It has been my misfortune to learn this by experience.

After a few failures I decided to place the stomach completely at rest to relieve the pain and to enable me to feed the patient for a time at least by simple jejunostomy. In the first case it was the only possible treatment. The complication of syphilis, extensive ulceration of the stomach, and four previous operations on the organ left nothing to work on in a very debilitated, middle-aged man. The jejunostomy succeeded beyond my expectations, and I was able to carry out a most satisfactory procedure later.

The next case was the man whose skiagrams are shown to you, debilitated through starvation and pain.

Extensive ulceration of the stomach was present; a leaking jejunal ulcer was found in a very debilitated subject. An X ray examination revealed a filling defect and suggested carcinoma. There was no possibility of carrying out any operation on the stomach, and jejunostomy was done. The patient reported back four months later, perfectly well, to know if he could have the jejunal tube removed. X ray examination showed perfect healing of all the ulcers.

Later, a similar patient with an extensive malignant type of ulcer in the stomach, in the *pars media*, and another ulcer near the œsophagus came in for treatment.

The patient was debilitated from pain and starvation, and the choice was between a complete resection, which would have been fatal, and jejunostomy; the latter was carried out. In three months' time the patient was readmitted to hospital, and X ray examination revealed a normal stomach; this was confirmed by food tests, and the tube was removed.

Another patient with a duodenal ulcer had constant pain and was half-starved. The duodenal ulcer healed, but the scarring required operation for stenosis later on.

In another instance a pyloric ulcer caused obstruction. Jejunostomy was performed and an anastomosis later.

These cases prove that, like other parts of the alimentary tract, the stomach responds to rest, and that if the lesion is not malignant it will heal. The pyloric and duodenal cases, however, show that a short-circuiting operation is necessary later on. Its disadvantage is the discomfort of the tube and the necessity for special feeding. On the other hand, a simple operation and three months of waiting are not too great a price to pay by a debilitated gastric ulcer subject.

In other cases, as in preparation for a gastric resection, jejunostomy is of great value; rest, cleansing and excessive feeding are valuable adjuncts for such an operation. The field is clean, and the anastomosis and duodenal closure must heal and all worry about vicious vomiting is over. Should vomiting of this type occur, wash the stomach out and later return the bile salts into the jejunum. There is no concern about feeding the patient during the first forty-eight hours; that goes on as though nothing had happened. Thus all stomach operations in this class of patient can be staged as simply as in the colon—jejunostomy, anastomosis and resection. The fistula closes on its own account if Mayo's omental method is used.

Conclusion.

I have endeavoured in this short paper to tell you some of the lessons I have learned in the hard school of experience.

I am sorry to relate that every one of them has been forced on one as the result of some failure; and this in major abdominal surgery most often means a fatality.

In considering the four great groups of conditions, those of gall-bladders, prostates, colons and stomachs, one learns that the same principles—careful diagnosis, preparation, planning, staging and attention to detail—apply to all. They apply to all these conditions in such a way that extensive complicated procedures can ultimately be carried out with comparative safety.

Reports of Cases.

BLINDNESS FOLLOWING HEAD INJURY.

By J. C. Douglas, L.R.C.P. & S., D.O. (Oxon),
Honorary Ophthalmic Surgeon, Ballarat Hospital.

M.L., aged fifteen months, fell from her cot on February 3, 1937, striking her head on the floor. She lay in bed at home for three weeks under medical attention. During that time she appeared to take no interest in her surroundings.

On February 23 she again fell out of her cot, striking her head on the floor. She was sent to hospital next day. On admission there was a bruise on the left side of the head and on the left leg. She was semiconscious. Her temperature was 37·8° C. (100° F.), her pulse rate was 160 per minute, and her respiratory rate was 28. Her systolic blood pressure was 76 millimetres of mercury. The pupils were equal and moderately dilated, with doubtful reaction to light. She was pale and listless, occasionally cried loudly, and had no movement of her left leg. X ray examination revealed an oblique fracture three inches long in the left temporal bone, and open fontanelles. On the evening of February 24, 1937, there was twitching of the left side of the face and left arm; the pupil reactions were doubtful and the knee jerks were exaggerated. A provisional diagnosis of subarachnoid hæmorrhage was made. On February 26, 1937, she had twitching of both sides of the face, left fingers and left leg, with some spasticity of the leg. On February 27, 1937, conjugate deviation of the eyes to the right was present, the pupils did not react to light, and all the limbs were rigid. On March 13 (seventeen days after her admission to hospital) the nurses reported that the child did not appear to see anything. On March 16 a fundus examination disclosed bilateral papilloedema with almost three diopters of swelling in each eye and with many retinal hæmorrhages. There was conjugate deviation of the eyes to the right at times and convergent squint at other times. The pupils were equal, moderately dilated, and did not react to light. The little patient appeared to be blind. Tests

were made with the electric torch, with bright-coloured toys, and with articles of food, such as biscuits.

The condition suggested a chronic subdural hæmorrhage in the region of the chiasma and third ventricle, or a hæmorrhage into both optic nerve sheaths from the fractured skull.

On March 23, 1937, the papilloedema was found to be subsiding. Pale optic disks were visible. The hæmorrhages were changing colour, showing many white patches in their centre, whilst they were decreasing in size. On April 9, 1937, all the spots of hæmorrhage had changed to white exudate and were in process of absorption. The optic disks were in a state of secondary atrophy, with shallow cupping and narrowed vessels. Elsewhere the chorioidal vessels showed up normally for a child. There remained no doubt that the child was blind.

It seemed to me that the linear fracture in the temporal bone continued as a basal fracture into the sphenoid bone in the region of the optic foramina on the two sides. Fracture of the base of the skull had damaged, without dividing, the optic nerves, causing hæmorrhage into the subdural sheath of the nerve. This hæmorrhage in turn compressed the central retinal vessels, leading to the papilloedema. It was a severe and tragic result from a simple fracture of the skull. No intracranial operation was thought advisable, for the following reasons. The papilloedema could not be due to increased intracranial pressure in a skull already open at the fontanelles. The exact location of any subarachnoid hæmorrhage was uncertain. The mortality rate in exploring for subdural or subarachnoid hæmorrhage is quite high. A more limited operation to incise the vaginal sheaths of the optic nerves was not undertaken because of their inaccessibility at the back of the orbit, and because it was considered that there was a reasonable chance of recovery of some vision after the subsidence and absorption of the papilloedema. The downward progress of the eye condition was, however, more rapid than expected. Less than six weeks elapsed between the first discovery of the papilloedema and a fairly complete secondary atrophy. As the child recovered it was not possible to verify the diagnosis of a hæmorrhage into both optic nerve sheaths.

RETINITIS PIGMENTOSA.

By SIR JAMES BARRETT,
Melbourne.

IN the transactions of the Australasian Medical Congress (British Medical Association) held at Hobart in 1934, I recorded seven cases of *retinitis pigmentosa* in which cervical sympathectomy had been performed. In five of them, which were advanced cases, with fields extremely small or unchartable, no definite favourable result was obtained, though in two a stationary result had been obtained in the short period which had elapsed since operation.

But in one case (Case VI), in which operation was performed in April, 1932, with vision of $^6/_6$ in right and left eyes, the form vision had remained unaltered, but the fields had remained less than 20° by June 7, 1933. But on November 28, 1933, the field had greatly enlarged. The fields are published in the transactions.

I have had an opportunity of reexamining this patient on June 29, 1937. The vision is now $^6/_6$ right, and $^6/_6$ minus one letter, left. The fields taken with the spot-light, however, are nearly normal on the right side and not greatly short of normal on the left. With ordinary rather poor daylight the fields are still three to four times larger than they were prior to operation. The appearance of the fundus is still that of *retinitis pigmentosa*, with the characteristic appearances of the disks.

The seventh patient underwent operation on June 17, 1931, his vision being then $^6/_6$ three letters right and left, and the fields being between 30° and 40°. Six weeks after operation the fields extended laterally to about 50°, and eight months after operation the right field had extended outward to between 70° and 80°. His vision on April 6, 1937, was $^6/_6$ right and left, that is, better than before operation. The fields, however, have retrogressed, chiefly laterally, but are still better than before operation. The patient has, however, developed evidences of some general nurological lesion, namely, slurring of speech and difficulty in walking, which may or may not complicate the eye condition.

Reviewing the position, it is obvious that:

1. The increasing number of cases of *retinitis pigmentosa* can be checked only by genetic measures.

2. Once the disease has developed, sympathectomy offers the only hope of amelioration.

3. Three possible results may follow operation, namely: (*a*) permanent arrest and possibly improvement, (*b*) delay in the development of the disease, (*c*) failure.

4. In all cases, and especially in the early stages, the issue should be put plainly to these unfortunate patients and they should decide for themselves.

So far no complications have resulted from the operation itself, except in one case, in which enormous swelling of the inferior turbinated bodies appeared and which was relieved by excision and cauterization.

A PECULIAR SEQUEL TO A FOREIGN BODY IN THE EAR.

By R. H. BETTINGTON,
Sydney.

A child, aged five years, put a nodule of "pussy willow" into his right ear. His doctor removed a piece which was not complete, and thought he saw some more there, but the child was most difficult to manage, so he sent it to the Ryde Soldiers' Memorial Hospital on August 6, 1936, and asked me to examine it under an anæsthetic.

On examination I found another piece of the foreign body, which appeared to be through the tympanic membrane, and when it was removed an anterior perforation of moderate size was seen.

The ear gave no trouble for a fortnight and then began to discharge freely and was treated first with *Spiritus Vini Rectificatus* drops and later with iodine and boracic powder for four weeks. The child was most intractable and difficult to examine, but the perforation appeared to be unaltered and a pulsating discharge was present from the posterior aspect. There was no improvement, so some moderately sized tonsils and a large pad of adenoids were removed. Further examination of the ear at this time revealed some angry-looking granulations through the perforation, and while the discharge was being wiped away a further piece of "pussy willow" was removed.

X ray examination on October 5, 1936, revealed a mastoid with well-defined cells, which appeared clear. The patient was not seen for some time, but eventually came back to the out-patient department, on February 20, 1937, with its ear still dirty and the appearance much the same as before. The cortical mastoid operation was performed on March 17, 1937, and the bone was found to be cellular; and while there was no œdema of the cell membrane, a clear yellow fluid, slightly offensive, was found in both the antrum and the neighbouring cells.

A seeker, introduced gently into the additus, came up against an obstruction which gave way on slight pressure, and then examination of the ear brought to light another piece of "pussy willow", which must have been wedged into the additus. Recovery was rapid and complete, the ear being dry after five weeks, but the perforation was still present and larger than before.

This case is of interest, not because of any extraordinary nature of the foreign body, but from the impaction in the additus, which must be very rare. It is an open question whether the wound in the tympanic membrane was made by the foreign body itself or by subsequent attempts to remove it. It is fairly obvious that pulling out the second portion forced a piece, already in the middle ear, backward into the additus.

Reviews.

SURGERY.

ROMANIS AND MITCHENER'S well-known surgical text-book has now entered its sixth edition, evidence that it has efficiently filled a need.[1] In this edition the worst of the anomalies, the occasional imbalance and some omissions of the previous edition have been in the main corrected. The work in consequence has been greatly improved, while some new and valuable illustrations have been added. There is no alteration of the arrangement, which follows classical lines, while the set-up and printing are as excellent as before. Although it is worthless, the use of potassium permanganate is still advocated in the treatment of snake bite, nor is the value of suction on the wound sufficiently emphasized. There is still no clear picture of the danger signs of the transfusion of incompatible blood. It is rather surprising to find that the dangerous proceeding of spraying burns of the face with tannic acid and so risking injury to the cornea is illustrated in Figure XIV. There is an interesting section on the treatment of gas casualties, which should prove of great value. The general chapters, such as those on muscles, tendons, bursæ and fractures, are very good, those on the last mentioned subject being well balanced. The sections dealing with joints and allied subjects have been somewhat amplified and improved.

The second volume contains some modifications which are improvements, particularly in those sections dealing with neurosurgery and urology. The chapters devoted to diseases of special organs are still amongst the best in the work, while those on the surgery of the abdomen are excellent and concise. We would suggest that for the benefit of their readers acknowledgement should be made by the authors to the work and contributions of famous surgeons of various nationalities. Students and others should be encouraged to know something about the giants of the surgeon's art, even if only to stimulate them to play their part in making further advances. Another addition which would make the work much more valuable would be the inclusion at the end of every chapter of a short bibliography of classical articles on the various subjects.

The book still remains one of the best text-books in English; it is up to date, well balanced and sound, and can be confidently recommended to both graduates and undergraduates.

OPERATIONS ON THE EYE.

A THIRD edition of "Ophthalmic Operations", by Harold Grimsdale and Elmore Brewerton, has appeared.[2] It is now seventeen years since a previous edition was printed, and during that time ophthalmic surgery has made many strides. In the preface to the third edition the authors stress the fact that the most outstanding work on ophthalmic surgery since the previous edition went to press is that of Gonin on detachment of the retina, and quite rightly so; but we think at the same time that they might have emphasized the fact that the work being carried on in England and America on keratoplasty by Tudor Thomas and Castrovijo is one which in the near future should be as important as that of Gonin. The authors also state in the preface that much of purely historical interest in the development of ocular surgery has been excised from the third edition. We believe that the historical aspect of an operation and the refinements which it goes through from its commencement to the present day are a great help to students of ophthalmology in assessing the various steps in the technique and the pitfalls which may be encountered. The time has come when some enterprising surgeon should compile a book of pitfalls in ophthalmic surgery, for we think by so doing he would confer a very valuable blessing on ophthalmic surgery as a whole.

The first chapter in this book is entitled "Operations on Muscles", but no mention is made either of the anatomy or physiology of muscles or of the advantages of orthoptic training before and after operation. One statement made by the authors—"that since a squint sometimes disappears spontaneously even during adult life, no operation should be undertaken until it is fairly certain that the defect is likely to become permanent"—is open to grave question. To wait until every patient with squint reaches adult age before an operation is performed would mean that all patients with strabismus which did not respond to glasses or orthoptic exercises would be condemned to strabismus life and to the development of a feeling of inferiority until they arrived at manhood or womanhood.

The second chapter on ptosis, while surveying the routine operations in some detail, makes no mention of that operation advocated by Blaskovics which utilizes the levator tendon somewhat in the manner of the operation devised by Sir William Bowman many years ago. This operation advocated by Blaskovics has, in skilled hands, proved probably the most successful of all ptosis operations and should be worthy of a place in a book of this size.

In the next two chapters are described operations on lids, and it is interesting to note that amongst those for cicatricial entropion is an operation devised by Sir James Barrett and W. D. Orr, of Melbourne, in 1904.

The next three chapters are devoted to routine operations on the conjunctiva, globe and lachrymal apparatus. In the chapter on the lachrymal apparatus there is a section devoted to the formation of an artificial passage into the nose. There seems no doubt that those operations performed by the intranasal route have on the whole not given the results expected by their originators; but it appears that external dacryo-cysto-rhinostomy does, when carefully performed, give surprisingly good results; in view of these circumstances we think that more details of the external operation might have been given and illustrations of the various steps added.

The eighth and ninth chapters deal at length with the various methods employed for the removal of cataract and of after-cataract; and here will be found a fairly concise section on various forms of intracapsular extraction, with special reference to Sinclair's modification of Elschnig's technique.

The section on the ocular treatment of glaucoma describes the various classical operations for the relief of intraocular tension; but as this is an English book, for English students, and as Elliott's cornea-scleral trephining is the most commonly performed operation for glaucoma in the English-speaking world, we think more prominence might have been given to Elliott's technique. Six pages have been devoted to Lagrange's sclerectomy and only one page to Elliott's operation.

Almost side by side in Chapter XI are described the three most outstanding advances in operative surgery since the second edition of this book appeared in 1920. These are the latest technique in keratoplasty, the modern technique of occluding a hole in a detached retina, and the use of radium in ocular diseases. While the first two are

[1] "The Science and Practice of Surgery", by W. H. C. Romanis, M.A., M.B., M.Ch., F.R.C.S., F.R.S., and P. H. Mitchiner, M.D., M.S., F.R.C.S.; Volume I: General Surgery; Volume II: Regional Surgery; Sixth Edition; 1937. London: J. and A. Churchill Limited. Medium 8vo, pp. 893 (Volume I) and 1063 (Volume II), with 800 illustrations. Price: 15s. net each volume.

[2] "A Text-Book of Ophthalmic Operations", by H. Grimsdale, M.B., F.R.C.S., and E. Brewerton, F.R.C.S.; Third Edition; 1937. London: Baillière, Tindall and Cox. Medium 8vo, pp. 331, with illustrations. Price: 17s. 6d. net.

fairly adequately described, the small section on radium is completely inadequate. In view of the excellent recent reports from Roy Ward, Foster Moore and H. B. Stallard, we think that a separate chapter should be devoted to the use of radium.

The twelfth and final chapter is devoted to foreign bodies of the eye. The increasing importance of ocular injury, in view of recent workers' compensation acts, makes us think that much more should have been made of this chapter. There is no doubt that if legislation were passed refusing compensation to those employees not wearing protective goggles in dangerous occupations, more than half the present-day eye accidents would be speedily eliminated. Such legislation as this has already been passed in Switzerland, and the eye injuries in that country have been reduced dramatically to one-third of their previous number.

In conclusion, while warmly recommending the book to practising ophthalmic surgeons as a work of reference, we still feel compelled to state that if the complications occurring during and after the operation had been enumerated, they would have greatly added to the value of this work. It would appear that there is ample room on the bookshelves of all ophthalmic libraries for even a more detailed work on ophthalmic surgery from the pen of Grimsdale and Brewerton.

RADIOLOGY OF THE CARDIO-VASCULAR SYSTEM.

REPORTS of English studies in the field of cardio-vascular Röntgenology are comparatively scarce compared with the very great volume of original descriptive literature upon this subject in French and German. The best text-book on the subject, which has crystallized the most important work of his predecessors, besides much of his own doing, has recently been published by Hugh Roesler in the form of a handsome volume in art paper called "Clinical Roentgenology of the Cardiovascular System".[1] Dr. Roesler was one of a band of brilliant Viennese doctors who relinquished their native city to accept posts of importance in the New World. As associated professor of Röntgenology and cardiologist to the Hospital University, Philadelphia, he has had the opportunity of extending his radiological observations. In this book, which is splendidly illustrated, appear pictorial contributions from many observers in Germany, Italy, Austria and America. Each important description in the text is illustrated by a film reproduction or line drawing of exceptional didactic value. The legends are so comprehensive that by reading these alone and studying the characters of the illustration indicated therein a reader would gain much practical knowledge. That the author is a philosopher and has a broader outlook than many radiologists is obvious from the preface and its many quotations.

More than the first third of the book is devoted to matters of technique and measurement and, more fundamental still, to detailed descriptions of the vagaries of entirely normal appearances. Most chapters are rounded off by a summary and are followed by a very generous and hand-picked bibliography. Sections entitled "Anatomical, Clinical, Roentgenological Considerations" and "Cardiovascular Disease from the Viewpoint of Etiology" show how closely the work is facetted with cardiological text-books of the usual clinical variety. The later chapters even describe the appearances seen in glycogen storage disease, starvation and X ray damage.

It is refreshing to become acquainted with a prominent authority who is obviously most critical of actual cardiac mensuration, and who is prepared to say that the nearest rule-of-thumb guide to the heart side is that of the closed first of the owner. The only measurements to which Roesler appears to pay any constant attention are the longitudinal, transverse and antero-posterior diameters of the heart and the cardio-thoracic ratio. He proceeds to give an excellent critical review of cardiac dynamics and kymography. Reasons, book and verse, are given for all his statements, and there are descriptions of animal experiments, which unfortunately are not widely enough known. Particularly noteworthy in this regard are those designed to reveal the end results of continual exercise in animals, chiefly rats and dogs. Discussing the results of strenuous sport and physical exercise upon heart size, he writes: "In case of definite cardiac enlargement, one should consider athletic activity only as a contributing factor, and search for other primary etiology". Further excellent descriptions of the exact changes in cardiac size in pneumonia, which are stated to be unexpectedly slight, of the effects of drugs upon the area of the heart shadow, of changes in rickets, of thoracic deformity, of tuberculosis (here the heart is small in less than 10% of patients), and a hundred other clinically indefinite questions. We read that visible calcification of the coronary arteries, as opposed to that in the peripheral arteries, is rare. A magnificent description covers the vagaries of aortic enlargement and the differential radiological diganosis of aortic aneurysm.

The work is an unfailing mine of information, and constitutes the most valuable source of reference available in this field of work. Chapters are ultimately appended upon venography, arteriography and disorders of cardiac rhythm. While the print is small, the arrangement is excellent, the text pithy, orderly and practical. Though hardly a work for tiros, it can be recommended with the utmost confidence to all practising radiologists and cardiologists.

[1] "Clinical Roentgenology of the Cardiovascular System. Anatomy, Physiology, Pathology, Experiments and Clinical Applications", by H. Roesler, M.D.; 1937. London: Baillière, Tindall and Cox. Double crown 9mo, pp. 360, with 200 illustrations. Price: 34s. net.

PATHOLOGY OF THE CENTRAL NERVOUS SYSTEM.

OF recent years a number of new books on neuropathology have appeared, becoming the more valuable as they have included the results of newer histological methods, *résumés* of the works of laboratories given over to experimental neuropathology, as well as the grouping together of apparently diverse diseases as a result of the increased number of rare cases being encountered. In his "Pathology of the Nervous System"[1] Dr. Courville leaves the beaten track and does not give us a glorified dictionary of neuropathology. After indicating what percentage of the cases under discussion would be found in his records of 15,000 cases examined *post mortem* by him and/or by his students in the Los Angeles County Hospital, he stresses the absolute necessity of his students' thinking, reasoning and tracing as far as is humanly possible the course of events, both in point of time and place, as well as by more scientific methods, the real starting point of the trouble and the proper sequence of development of lesions.

As a consequence the reader will miss many histopathological pictures and paragraphs, but if he successfully follows the methods outlined (obviously, if possible, in collaboration with the clinicians) he will often be provided with a scheme showing the pathological chain of events with which to correlate his clinical notes. All this falls in with the modern method of approach—the student must be preferably an embryo research worker before being a walking dictionary.

Rare or relatively unimportant diseases are but lightly touched upon, and intracranial and spinal tumours are presented chiefly with the view of revealing how they distort the brain, alter ventricular shapes, or damage neurones by their special method of growth and invasion. He would have his students ruling out brain tumours as an everyday event. Diagrams also warn students where primary growths may take origin in the body. Holding that brain trauma, vascular disease or malfunction, and

[1] "Pathology of the Central Nervous System: A Study Based upon a Survey of Lesions found in a Series of Fifteen Thousand Autopsies", by C. B. Courville, M.D.; 1937. California: Pacific Press Publishing Association. Royal 8vo, pp. 344, with illustrations. Price: $5.75.

infections from cranial air sinuses are the commonest lesions met with, he gives special attention to these groups.

The way these subjects are dealt with indicates his scheme. Commencing with many fine pictures of the neurone and its pathological processes at the edges of lesions, he next deals with the many disguises which the various glia elements adopt. A really good diagram discloses the functions of the cerebral vascular system, wherein the various glia and also the vascular endothelial fibroblasts and new capillaries proceed to take their part in inflammation and repair. Changes in the chorioid plexus and ventricular ependyma are included. A short but useful article on anomalies and malformations, mostly congenital, is included obviously to remind readers that such lesions may explain certain physical signs and X ray pictures. Birth injuries are very clearly delineated. A description of arteriosclerosis includes a diagram picturing the possible sources of embolisms, and here again stress is laid on the deformity caused in the brain mass by the hæmorrhage or the accompanying œdema in apoplexy, to be thought of in cases showing ventricular distortion. Quite a full account is given of many possible sources of vascular trouble, whether arterial, venous, sinus, capillary or vascular malformation, and the photographs are illuminating. Perhaps the best part is that dealing with the many forms of pustular meningitis or abscesses occurring after infections of the many intracranial air sinuses, the diagrams here clearly showing the connexions of the infected brain and the many individual infected air cells.

Both here and in the author's very full description of the effects of brain trauma from every likely source, force and direction, the student is required to recognize the fundamental facts disclosed from the more simple cases and to apply them to more complicated lesions. *Contrecoup* and its effects are given prominence both diagrammatically and by excellent photographs. The author is careful here to indicate that about two hundred cases of this type had to be studied elsewhere than in his hospital.

The book ends with a number of clinico-pathological aphorisms; for instance, the author restates the warning about supposing the lesion under discussion to be the only one in the body, and we quite agree with his finding that quite an insignificant congenital vascular lesion may not disclose itself by rupture or otherwise till adult life, and that lesions of this type are often not given the value they deserve. He is at variance with some of the accepted ideas about the so-called post-traumatic apoplexy, maintaining that there was cerebral vascular disease *ab initio* and that the trauma is a coincidence. Not everyone will accept this *in toto*. The author follows recent thought in accepting a functional disturbance of the nervous control of the meningeal and cerebral vessels in the post-concussion syndrome and that this phenomenon may be followed by neuronal atrophy. This is not a book for students studying for examinations. On the other hand, it presents an excellent guide to the senior student in the approach to the examination of the central nervous system, especially because it envisages so clearly the innumerable lesions elsewhere in the body which might initiate the nervous lesion or lesions discovered at autopsy. It insists on the close cooperation of clinician and neuropathologist.

MEDICINE FOR NURSES.

THERE are many short courses of medicine written for nurses and as short *résumés* for students, but they are seldom so comprehensive, simple and concise as "Medicine for Nurses" by Dr. W. Gordon Sears.[1] The fact that Dr. Sears is an examiner to the General Nursing Council for England and Wales should render him competent to judge just what nurses are expected to know about each disease and its treatment. Certainly each subject is set out with clear headings and paragraphs exactly as one would wish to set it out in one's mind and in an examination paper. It should prove an excellent book for nurses.

The diseases are classified in the orthodox way according to systems, with the exception of the infectious diseases; and there are very helpful chapters on the causes of sudden death, poisoning, and a brief *materia medica* with practical instructions about the administration and care of drugs. The book concludes with tables of weights and measures and formulæ for conversion from one system to another, Latin phrases and prescription abbreviations, and derivations of medical words, and lists of common food analyses and values. These should prove of great practical use to the nurse.

One of the best features of the book is its clear instructions for treatment, often in note form, but where necessary described in minute detail; generalizations are avoided. The illustrations are rather of the nature of diagrams to explain the text than to give pictures of diseased states, the aim being, as the author states in his preface, for the nurse to gain her impression of these from her clinical pictures of patients themselves.

Many points perhaps not absolutely necessary for the nurse are included, but they help to interest her more deeply in her cases and to enable her to cooperate more closely with the medical attendant. The book is also handy in size and should prove of value not only to trainees, but to graduate nurses as well; it may even be of assistance to those who are planning courses of lectures for hospital nurses.

[1] "Medicine for Nurses", by W. G. Sears, M.D., M.R.C.P.; Second Edition; 1937. London: Edward Arnold and Company. Crown 8vo, pp. 443, with illustrations. Price: 8s. 6d. net.

MEDICAL EMERGENCIES.

IN a new attempt to describe the conduct of medical emergencies,[1] Dr. C. Newman has drawn freely from Marriott's "Acute Poisoning" and has introduced a well-written and reasonable innovation by the inclusion of measures to aid sufferers from the effects of war gases. Agranulocytosis is accepted by him as an "emergency"; this is in accord with the opinion expressed in our review of the first edition, wherein we pointed out how difficult it is to set a limit upon the term. The section upon coma is of practical value, but is skimpily dealt with in parts. We still see provocative remarks, such as an unqualified statement that Brudzinski's sign is infinitely more reliable than Kenny's sign, and that the localization of a cerebral tumour is not a matter of urgency, and "epilepsy never starts over the age of thirty years". A couple of pages are devoted to "coma in hot climates", which includes a clinical description of that most dangerous of diagnoses, "sunstroke". Malarial coma is described without that even more fatal complication blackwater fever receiving a mention. We commented previously upon the inadequate space devoted to that most serious and difficult emergency diabetic coma. Dr. Newman would still limit us to no more than forty units of insulin as a primary dose for a comatose individual. He makes no mention of protamine insulin, of the necessity for the use of hypertonic saline solution, of the immediate post-coma diet, and a dozen other important details. It is just in these situations that reference to such a book as Dr. Newman's is most wanted.

Myocardial infarction, a common emergency, is most inadequately dealt with. A forgotten physiology is resurrected from time to time to explain the use of certain drugs. The Meulengracht plan for the feeding of patients who have bled from peptic ulcer is conspicuously avoided in the remarks upon this crisis. A further section upon a plan for the care of patients with acute purpura, thrombocytopuric and otherwise, is wanted.

It is refreshing to note that the unitage of antidiphtheritic serum required at the time of the first therapeutic injection has been raised to 16,000.

In spite of persistent and even fresh defects, we will still recommend this book to the student and newly fledged general practitioner.

[1] "Medical Emergencies", by C. Newman, M.D., F.R.C.P.; Second Edition; 1937. London: J. and A. Churchill Limited. Large crown 8vo, pp. 160. Price: 8s. 6d. net.

The Medical Journal of Australia

SATURDAY, MARCH 19, 1938.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

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SEX AND SOCIETY.

ALMOST five years ago we reviewed in this journal Havelock Ellis's "Psychology of Sex". At that time we referred to Havelock Ellis as a wise and kindly counsellor, and described his book as being marked by sanity, understanding and a sympathetic outlook. The "Studies in the Psychology of Sex", by Havelock Ellis, a work of six volumes, are well known. The book reviewed in 1933 was not intended either to supplant or to summarize part of the larger work; it was intended as an introduction to sex psychology and admirably fulfilled its purpose. Ellis has now published an abridged and revised edition of the sixth volume of his famous "Studies", an edition not intended to supersede the original sixth volume, but intended for a wider public.[1] At the present time sex is a subject on which many would-be authors try their prentice hands and on which older writers on other subjects make but a poor showing. Sex, previously taboo, is now discussed freely in the market place and in every other place, reticence has fled, there are few repressions, and he who would call a halt or ask for moderation is old-fashioned. No one will deny that knowledge on sex matters is necessary for both the young and old of the present day; but not everyone will admit that those qualified to impart that knowledge are few. Havelock Ellis has spent a long life writing and teaching his fellow man. In his early years his writings were not all regarded as they are today; and in bringing to the notice of readers his volume "Sex in Relation to Society", we would point out that he writes with mature judgement and at times with prophetic insight.

One of the most interesting statements in this book appears in the preface. Ellis states that when he examines his work of thirty years ago, as he had to do to publish this revised volume, he receives two impressions. The first is that many small advances have been recorded, and the second (and this is most important) that at every main point everything that he wrote before still holds true and that the conclusions drawn then are as much in need of emphasis today as they were when they were first stated. Perhaps the most important chapter in this book is the first chapter—that dealing with the mother and her child. Ellis believes that what we need above all is a higher standard of physical motherhood. "The problem of infantile mortality . . . is not alone of sanitation, housing, or even poverty as such, but mainly a question of motherhood." He makes a plea for adequate provision for the unmarried mother, that she may be able to receive shelter and care in secrecy and to preserve her self-respect and social position. It is, he points out, not enough to say that a woman ought to rest during her pregnancy; it is the business of the community to see that she does rest. The community suffers when inferior children are brought into the world. There are many matters which may safely be left to the discretion of the individual, but "the care of the mother and her child is not among them". A statement which will give rise to serious thought is that if it were necessary to choose between the task of getting children educated and the task of getting them well born and healthy, it would be better to abandon education. The reply may perhaps be made that an enlightened and

[1] "Sex in Relation to Society, being the First English Edition of Volume VI of 'Studies in the Psychology of Sex' Abridged and Revised", by Havelock Ellis; 1937. London: William Heinemann (Medical Books) Limited. Demy 8vo, pp. 544. Price: 12s. 6d. net.

educated State would see that its children were "well born and healthy". Everyone knows, however, that when most people talk of enlightenment and education they think of children who have passed the pre-school age. There are doubtless many who think of the pre-school child and his or her welfare, but those who strive for the health and well-being of the *fœtus-in-utero* and of the mother who bears it are not numerous. Ellis refers to a French industrial undertaking which employs married women. At this place the salaries of expectant mothers are raised and arrangements are made for giving them proper advice and medical attendance; they are not allowed to work after the middle of pregnancy or to return to work after confinement without a medical certificate of fitness. This, we venture to predict, will some day be the attitude of all progressive States.

It is not our intention to review this excellent book in detail. There are chapters on sexual education, sexual education and nakedness, the valuation of sexual love, the function of chastity, the problem of sexual abstinence, prostitution, the conquest of venereal disease, sexual morality, marriage, the art of love and the science of procreation. Any person who considers sex in relation to society will straightway think of the attitude of modern youth to sex. Ellis in his preface sums up the matter in an excellent fashion. He states that it is increasingly felt that every young person, even of either sex, must possess the knowledge necessary to form a judgement as to his or her own needs. Young people will all agree with this; they should, however, have impressed on them the remainder of Ellis's statement—that every young person must be held responsible for the necessary self-control and self-discipline. Ellis carries his discussion into marriage and the relationship between husband and wife. "Marriage is not a mere licence to practise sexual intercourse . . . it is also an arrangement for securing the happiness and well-being of the partners themselves." Much more might be written about this book, but enough has been written to stimulate medical practitioners to buy and study it. Longfellow wrote that self-reverence, self-knowledge and self-control could alone bring life to sovereign power. Some may hold that this is by now almost a trite saying, but it is one never to be forgotten where sex and society are concerned.

Current Comment.

FUNGICIDES.

A CASUAL glance at the feet of a group of sunbathers on an Australian beach will suggest to the observer that at least one fungus infection is difficult to eradicate. There are others. Substances used as fungicides are so numerous that one might reasonably doubt the efficacy of every one of them. Tests *in vitro* of the fungicidal properties of a number of substances have been made by P. A. Maplestone and N. C. Dey.[1] As a culture medium they used Sabouraud's maltose peptone agar at a hydrogen ion concentration of 6·0. They stirred into the medium the substance to be tested while the medium was still in a molten state, but at as low a temperature as possible, to avoid possible decomposition of the substance through heat; they found this temperature to be 45° C. When solidified the medium was inoculated with a small portion of an undiluted stock culture of *Achorion violaceum*, *Achorion actoni*, *Microsporum audouini* or *Epidermophyton cruris*. Each substance was tested against each of these fungi. As they had found that infection with *Achorion violaceum* was frequently complicated by a pustular eruption due to *Staphylococcus aureus*, the efficacy of the various substances against a selected strain of this organism was also tested. They made emulsions of fungi and of *Staphylococcus aureus* in a dilution equivalent to 900,000,000 to 1,000,000,000 organisms per cubic centimetre, and mixed with these the substances to be tested in varying dilutions. Sabouraud's medium was inoculated at intervals from the mixture. Some interesting information emerges from their experiments. Among substances frequently used in the treatment of ringworm, benzoic acid, salicylic acid, basic fuchsin, perchloride of mercury and mercurochrome were found to be comparatively ineffective both in inhibiting the growth of fungus and in direct fungicidal activity. Iodine had little effect in preventing the growth of fungi, but was one of the most effective substances as a fungicide. This is not easy to understand; possibly the iodine entered into combination with some constituent of the culture medium. "Merfenil" was found to have a strong fungicidal action, being particularly effective against *Epidermophyton cruris*. Brilliant green is strongly fungicidal to *Achorion violaceum*, and crystal violet readily destroys the strain of *Staphylococcus aureus* that often associates with it. However, a combination of the two has a comparatively slight effect on *Achorion violaceum* but a remarkably

[1] *The Indian Journal of Medical Research*, January, 1938.

powerful fungicidal action on *Epidermophyton cruris*. Maplestone and Dey suggest that a new compound is formed in the mixture. Brilliant green was shown to destroy readily all the other fungi used in the experiments.

The results of these tests are of great interest; but they should be taken as a guide only. Many factors apart from fungicidal activity have to be considered in the therapeutic application of a substance. Maplestone and Dey intend to conduct clinical tests based on their findings. Their next report on the subject should be of greater value.

WEIL'S DISEASE.

IT is worth while again drawing attention to Weil's disease, or spirochætal jaundice, more particularly since the disease has been worked on and well studied and described by Australian investigators. A. R. Gaines and R. P. Johnson, of the United States Army Medical Corps, in reporting seven cases, remark that it is not certain whether Weil's original four cases described in 1886 were actually cases of this now sharply defined infectious disease, but since the causative organism was discovered in Japan in 1916 a world-wide distribution of the infection has been revealed.[1] Only laboratory investigation can establish the diagnosis without doubt, but it is important that a diagnosis should be made because of the public health importance of the disease. Fortunately, even though the leptospira cannot be demonstrated in the blood or urine during the clinical course of the infection, it is possible to carry out serological studies at a later date, since immune bodies persist in the blood for years. Gaines and Johnson quote the classification of Inada, which recognizes three stages, a febrile stage, an icteric stage and the stage of convalescence. These are not always recognizable, since jaundice, though usual, is not invariable. Among the chief features of the febrile stage are chills, high fever, abdominal disturbance, and a well-marked conjunctivitis, and at this time the leptospiræ are found in the blood and urine. It is during the second or icteric stage that death occurs in fatal cases, but usually after the second week the jaundice disappears and the patient, though often pale and wasted, begins to recover. The leptospiræ can still be found in the urine for several weeks, and in this connexion the significance of the clinical symptom of albuminuria will not be overlooked. A recurrent or relapsing bout of fever is also frequently observed. This rough summary is merely a reminder of the usual picture, which is no doubt fairly well known, but it is well that the possibility of the disease should be widely recognized, since wherever the rat goes spirochætal jaundice may be found. Needless to say, as in other infections, aberrant cases are not uncommon and may easily be missed. Gaines and Johnson present full notes of their cases, and these have some interesting features. One patient had worked in many places, including a rat-infested cheap hotel, and the diagnosis was promptly made by dark-ground microscopic examination on the day after his admission to hospital. Another patient suffered from prolonged jaundice and was submitted to laparotomy, since his jaundice was apparently obstructive in type, though Weil's disease was considered as a possible cause. Obstruction was actually found in the common bile duct at the duodenal ampulla, but in spite of the performance of an anastomosis the patient died some days later. It was thought in this case that the block was caused by inflammatory tissue, the effect of a persistent leptospiral infection. Another case was that of a man who was thought to have typical acute catarrhal jaundice, but owing to the discovery of Weil's disease in another case about the same time the leptospira was looked for and found. Still another patient is worth mentioning, since he was still under treatment for pulmonary tuberculosis in hospital when he complained of epigastric discomfort, which was followed by jaundice. It is further worth pointing out that Gaines and Johnson stress the fact that in five of their seven patients the infection ran an atypical course, varying considerably from the textbook picture quoted above. The actual mode of infection was not ascertained in this series, but there is no reason to believe that the ultimate source was other than that generally recognized: the rat which acts as a carrier.

It will be recalled that some of the recently reported outbreaks include such varied workers as fish cleaners in Glasgow, sewer workers in London, and cane workers in Queensland. In every case contact with rats has been responsible, though this contact may be quite indirect, and due to infected water or other material. This pest is one of the problems of the world. Zinsser, in his "Rats, Lice and History", after pointing out the omnipresent, omnivorous and superfertile nature of the rat tribe, quotes Shipley's estimate of seven shillings and sixpence as the worth of the damage done in one year by one rat, which worked out at £15,000,000 per year for Great Britain and Ireland. Other authorities give corresponding figures for other countries, none of which are lower than three shillings and sixpence per year for each individual in the community. Zinsser ends his chapter by stating that the "rat's most potent weapons against mankind have been its perpetual maintenance of the infectious agents of plague and typhus fever". To these we must add Weil's disease, and though this is not primarily a comment on rats, it may be recalled here that Victor Heiser, in his interesting "Doctor's Odyssey", subscribes to the estimate of one rat to every two persons in every city of the world. It is not intended here to do more than draw attention to the growing interest in this rather unique disease, its nature and its relation in some way or other in many cases, if not ultimately in all, to the rat. Awareness on the part of the general practitioner will no doubt bring to light an increasing number of cases.

[1] *Archives of Internal Medicine*, November, 1937.

Abstracts from Current Medical Literature.

DERMATOLOGY.

The Occurrence in Human Beings of Contagious Pustular Dermatitis of Sheep ("Orf").

G. A. G. PETERKIN (*The British Journal of Dermatology and Syphilis*, November, 1937) states that, though the condition of contagious pustular dermatitis or "orf" in sheep is well known to veterinary surgeons or farmers, there appears to be no record of its existence as a disease of mankind. He reports five cases which have occurred in human beings, and thinks that it must be more common in human beings than is realized. The condition has been shown by Aynaud to be due to a filtrable virus, and he found that the experimental lesions resembled those of the virus of vaccinia. In addition to his five patients, the author has seen others suffering from the same complaint, but their "orf" had reached a later stage; that is, the lesions were very like *granuloma pyogenicum*, though with no history of bleeding, and bacteriological examination revealed the presence of a mixed infection, with staphylococci predominating. In human beings the disease seems to run the following course. The first lesion to appear is a dark red papule, which grows to any size from that of threepence to that of half a crown. This is quite hard, and as a rule painless. Gradually the papule begins to resemble a huge red *molluscum contagiosum* tumour, with a very pronounced umbilication. The depressed centre is covered with thin white skin and contains clear exudate. This exudate gradually becomes purulent, probably owing to secondary infection, and granulations soon heap up. This stage is often painful. If the tumour is dressed with antiseptics it tends to shrivel up in a few weeks, without the appearance of any purulent discharge or granulations. The only difference between the lesions produced experimentally in animals and those found in human beings is a tendency for lesions in the latter to be umbilicated.

Pyogenic Relapse.

J. H. STOKES AND J. L. CALLAWAY (*Archives of Dermatology and Syphilology*, November, 1937) write on the subject of pyogenic relapse and sensitiveness to light in certain dermatoses. They find that intercurrent infections, in part at least presumably of the virus type, predispose to relapse and "presumably to clinically pyogenic and partly pyogenic (acneform) eruptions". These relapses tend to occur in persons with familial or hereditary predisposition to pyogenic attacks; they occur after mild as well as after severe attacks of intercurrent infection, and may even be suspected of occurring in comparatively asymptomatic carriers surrounded by patients with symptomatically active disease. The onset of these relapses tends to follow a period of incubation of from seven to eleven days, suggesting the development of an allergic or hypersensitive state. The development of such a state as part of an infectious-allergic complex is still further suggested in certain cases of relapse of primary pyogenic infection by the appearance of sensitiveness to light and apparently also of sensitiveness to both light and drugs. The authors think that their observations may be of importance as pointing towards an infectious-allergic background in pyogenic and pyogen-complicated cutaneous disease in general, and especially in acneform eruptions.

Lichenified Eczema of the Scalp Caused by Lacquered Hairpins.

M. H. GOODMAN (*Archives of Dermatology and Syphilology*, December, 1937) describes a case of lichenified eczema in a woman. The lesions were found at points on the scalp underlying the places at which the patient used lacquered hairpins. A positive reaction was obtained to a patch test made with scrapings from the hairpins. When bone hairpins were substituted for the lacquered variety the lesions disappeared.

Calcinosis Cutis.

M. E. PUSITZ, A. K. OWEN AND G. A. FINNEY (*The Journal of the American Medical Association*, January 29, 1937) report two cases of *calcinosis cutis*. The pathological changes in this condition consist essentially of a deposition of calcium salts in the skin, subcutaneous tissue and superficial fascia. Radiological examination reveals the granules clumped with an interlacing network attaching the clumps together. Sometimes the nodules can be felt, but when the clumps are diffusely distributed throughout the skin the area may have a wooden feel, as in lymph-œdema. There is a tendency to symmetrical involvement. Sometimes the nodules may break down and discharge, and as a result of infection ulceration may take place. Pain has not been reported in the literature as a prominent symptom, but in the authors' two cases it was pain which made the patients seek advice. The authors found that the calcium content of the blood was raised. Symptoms may be relieved, but from the curative point of view the prognosis is poor.

Dermatitis due to Shoe Leather.

H. D. NILES (*The Journal of the American Medical Association*, January 29, 1939) reports two cases of dermatitis due to shoe leather. He believes that many cases of this condition are wrongly diagnosed and treated as dermatophytosis. The first patient had been treated for a fungus infection. Examination revealed erythema, scaling, slight œdema and several excoriations and involuting vesicles on the dorsa of the toes. There was some erythema with vesiculation on the plantar surface of some of the toes, but the interspaces and soles were entirely clear. The eruption started about a month after the patient wore a new pair of tan shoes and black shoes and some new coloured socks. He subsequently wore white socks and the black shoes. A patch test from the lining of the black shoes and the socks gave a positive reaction. In the second case black shoes were responsible, and the lesion was somewhat similar to that of the first case, but the patch test gave no reaction. In neither case was there any predisposing factor, such as fungus infection or hyperhidrosis.

UROLOGY.

The Intramural Portion of the Ureter.

R. GAYET (*Journal d'Urologie*, September, 1937) contends that, considering the importance of the intramural portion of the ureter in relation to upper urinary tract obstruction, its anatomy, physiology and changes in disuse states are still too little understood. The disposition and action of the muscular layers have been the points of greatest controversy, but it seems fairly well established now that there are no definite circular or sphincteric fibres in this portion of the duct; the middle layer of muscle fibres of the free portion of the ureter stops short as the canal reaches the bladder wall. The muscular coat of the intramural portion of the ureter consists of longitudinal fibres only, and is separated from the thick surrounding vesical muscle bundles by a thin coat of adventitia, so that this portion of the ureter retains its separate identity of structure as it traverses the bladder wall. During an efflux of urine into the bladder, propelled from above by ureteric peristalsis, the longitudinal fibres just described contract so as to shorten and thicken the intramural portion. At the same time their tonicity increases, and it is believed that such tonicity responds to the degree of intravesical pressure present at the particular moment and so prevents reflux of vesical content up the ureter. In addition it is quite probable that pressure on this portion of the ureter by the immediately surrounding vesical muscle guards against reflux, especially during the ejaculation of urine. Hypertonicity, as well as true hypertrophy, of the longitudinal muscular fibres of this portion occurs as a defence mechanism

when there is any distal obstruction in the urinary tract, for example, prostatic obstruction, valves in the posterior part of the urethra *et cetera*. Such defence mechanism arises because of steadily increasing intravesical pressure, and secondarily, such hypertonicity and hypertrophy cause dilatation of the upper portion of the urinary tract. Hypertrophy of the surrounding vesical muscle from chronic infection or obstruction also causes pressure on the intramural ureter, with consequent hindrance to the free outflow of urine through it. The obvious treatment of such a condition is to remove the distal obstruction or the cause of the infection. The second great group of diseases of this portion of the ureter is in cases in which no distal obstruction or bladder wall disease is present, but simply a spasm of the intrinsic muscle arising from some general or obscure cause. Some of these cases may be congenital, the tendency to spasm having always existed, with consequent upper urinary tract dilatation becoming progressively worse throughout life. Some workers think that very often not a spasm but an achalasia, or absence of the power of relaxation, is at fault. Treatment should be, first, endoscopic electric ureteric meatotomy, with application of the retained ureteric catheter at intervals. Later, should it be necessary, forced dilatation of the intramural ureter by suprapubic approach may be used. Finally, a condition of atony of the intramural portion must be considered. It may be congenital, when there is a profound deficiency of muscular tissue, with consequent reflux and ascending infection leading to death in the early weeks of life. Acquired atony may arise from nervous disease, but more commonly is due to the failure of the defence mechanism of hypertonicity in the presence of a distal obstruction, or it may arise from toxic paralysis of muscle in local inflammatory conditions.

Tertiary Prostatic Hypertrophy.

UNDER the title "Tertiary Prostatic Hypertrophy" C. A. W. Uhle and P. D. Melvin (*Journal of Urology*, November, 1937) describe a case in which adenomatous enlargement of the prostate gland causing urinary obstruction and suprapubic fistula recurred twice after enucleation. At the time of the original operation the patient was sixty-one years of age. Suprapubic lithotomy and cystostomy were performed first, and a fortnight later prostatectomy was performed. A trilobed adenoma was enucleated and proved to be benign. Five years later the patient was readmitted to hospital with a recurrent suprapubic sinus. The sinus was dissected out and the bladder neck, which was found to be contracted and obstructed by inflammatory tissue, was resected with Young's punch. Eighteen months later the patient was readmitted to hospital with suprapubic fistula, which passed superficial to the pubic symphysis and had a small ostium near the base of the penis. The sinus was resected and again a trilobed adenoma was enucleated. Histologically the tissue was described as prostatic adenoma with chronic infection. Three years elapsed before the patient's fourth admission to hospital, again complaining of urinary fistula. This was again dissected out, but on this occasion the glandular enlargement was of less degree and was removed by the resectoscope. Again the pathologist reported benign adenoma.

Arsphenamine in Acute Urethritis.

A CLINICAL study of the value in gonorrhœal urethritis of the local application of arsenical solutions commonly used intravenously in the treatment of syphilis is submitted by J. E. Heslin and W. A. Milner (*Journal of Urology*, January, 1938). They point out that the value of these substances in non-specific coccal urethritis has already been proved. The solution advocated is sulpharsphenamine, 0·1 gramme in one drachm of distilled water. Treatments were given two to seven times weekly. Two drachms were injected and held in the urethra for ten minutes. In addition, rest, hygiene, bland diet and sandalwood oil orally were prescribed as usual. In a comparison of 152 cases treated by their old method and a similar number treated with arsphenamine, the authors found that the duration of the urethral discharge was decreased, the time required for cure was considerably shortened, and the incidence and severity of complications were lessened.

A New Chemical Antiseptic Method in Urology.

BELA MEZOE (*Urologia*, September, 1937) reports on results from lavage of different parts of the urinary tract with an antiseptic devised after a new method. He had bacteriological studies made of the bactericidal power of various commonly used antiseptics, and found that in some of them this power was very low and in none was it rapid. For instance, silver nitrate in a strength of one in a thousand took ten minutes to kill all subjected germs. Oxycyanide of mercury in a strength of one in three thousand took over two hours. Potassium permanganate in a strength of one in ten thousand took sixty minutes, and a 3% solution of boric acid was bacteriostatic, but not at all bactericidal. The author had the idea of combining two of such chemicals, hoping for a simple mixture in which the two components retained their identity and did not become merged through chemical action into a new compound, as occurred, for example, in Dakin's solution. The greatest practical success was achieved with the last two chemicals mentioned above, and he found that when enough potassium permanganate was added to a 3% boric acid solution to make a concentration of one in four thousand of the permanganate, ordinary pyogenic organisms were killed immediately or in a very few seconds, and this with a solution which is usually non-irritating to the urinary tract mucosa. The same result was achieved by adding potassium premanganate (one in five thousand) to a one two-hundredth normal solution of sulphuric acid. The addition of a one in five thousand solution of potassium permanganate to an equal quantity of 3% boric acid solution was completely bactericidal in twenty seconds. It is obvious, from a purely practical point of view, that if lavage in the urinary tract is to be of real value, bactericidal action should occur in a few seconds rather than in a few minutes or longer. The author quotes successful cases in various parts of the urinary tract in support of his proposal. It is necessary that the boric acid used should be chemically pure.

Diagnosis of Renal and Pararenal Tumours.

C. GÜTIG AND A. HERZOG (*Zeitschrift für Urologie*, September, 1937) consider that displacement of the kidney shadow itself, filling defects of the renal pelvic shadow in pyelograms and alterations in the calyces do not always arise from actual invasion of the urinary passages themselves by a renal tumour. Such appearances can arise from pressure from retroperitoneal and pararenal tumours and from other lesions, and also from renal cysts as well as very small commencing renal tumours which have not yet actually invaded the calyces or the pelvis. Renal efficiency is not affected in pararenal lesions or in smaller renal tumours and cysts, but in all renal lesions microscopic changes in the urine generally appear, while the urine remains unchanged in pararenal lesions.

Suppurative Renal Lesions.

S. OECONOMOS (*Zeitschrift für Urologie*, September, 1937) states that when symptoms or objective findings point to the development of suppurative lesions in a kidney, exploratory exposure of the organ should not be delayed. Should the surgeon find one or more localized abscesses in the organ, no matter of what size, he should content himself with incision and drainage. If a renal carbuncle is present, cruciate incision is employed, or if it can be easily carried out, excision of the affected portion of the kidney. When multiple small abscesses are spread over the superficial or cortical portion of the kidney, decapsulation suffices, with incision of any deeper abscesses. When abscesses are spread all through the kidney, nephrectomy is necessary.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held at Geelong on July 10, 1937, PROFESSOR R. MARSHALL ALLAN, the President, in the chair. Parts of the report of this meeting were published in the issues of January 22 and March 12, 1938.

Hyperparathyreoidism.

DR. KEITH ROSS showed a boy, aged nine years. The child was healthy at birth, but was fed artificially and had a very severe attack of enteritis at the age of two months. At the age of three years he had developed a limp and was kept in bed for some months. The right femur was explored for sarcoma and some tissue removed at operation was examined by a pathologist, but was not identified. During convalescence the femur was fractured by a slight blow, but normal union occurred. A year later the femur was fractured again, and after union occurred the child was allowed up in a caliper splint. While the child was wearing this splint *coxa vara* was noted. Soon afterwards the right tibia was fractured, and when the child began to walk again both the femur and the tibia became progressively distorted. In February, 1936, the tibia was fractured again, and once more in June, 1937, when Dr. Ross first saw the child. Apart from the bony disease and the fractures, the child was normal in all respects and did not even suffer any pain. Dr. Ross had referred him to Dr. S. O. Cowen for further investigation and advice concerning treatment. It was found that the serum calcium was 10·2 and the serum phosphorus 3·0 milligrammes per hundred cubic centimetres, and the urinary phosphatase was estimated at more than fifty units per hundred cubic centimetres. The child had been seen by many medical men in all the capital cities of Australia, with the exception of Adelaide. Some had been emphatic that he was suffering from *osteitis fibrosa cystica* and some that he was not. Dr. Ross said that he was in favour of this diagnosis, but thought that it was imperative to take into account the results of a full calcium metabolism test before a definite opinion was given. He knew that this investigation could be made accurately at the Royal Prince Alfred Hospital, Sydney, but he would try to arrange to have it done in Melbourne.

DR. T. A. MCLEAN, on behalf of DR. C. JAMES, showed a female patient, aged sixty-six years, who had been admitted to the Geelong Hospital on March 23, 1937. The history was that for the past five years her head had been growing larger, her neck was becoming very short and stiff, she was developing a pronounced stoop, and she was suffering from intermittent headaches. In September, 1936, she had sustained a spontaneous fracture of the left femur, necessitating hospital treatment till November, 1936. On March 20, 1937, three days prior to admission to hospital, she had developed right-sided abdominal pain and vomiting. The diagnosis of *osteitis deformans* was made, but the alternative diagnosis of abdominal malignant disease with secondary deposits in the bone was not discarded until the abdominal symptoms disappeared promptly and did not return, and a cholecystogram revealed no detectable abnormalities. The radiological examinations of the spine, pelvis, skull and long bones revealed the appearances of generalized fibrocystic disease and bony union at the site of the old fracture in the shaft of the left femur.

On April 15 the calcium content of the blood was found to be 15 milligrammes per 100 cubic centimetres. This estimation was repeated on four occasions at weekly intervals, and the results averaged approximately 15 milligrammes per 100 cubic centimetres of blood. It was not found possible to determine the calcium balance, but the diagnosis of generalized *osteitis fibrosa cystica* was made and the patient was put on a high calcium diet, with 3·55 cubic centimetres (one drachm) of "Adexolin" daily. On May 28, 1937, Dr. James had attempted parathyreoidectomy. A specimen of tissue for section was obtained from the posterior aspect of the right lobe of the thyreoid gland, which proved to be a piece of calcified thyreoid tissue. At an interval of two weeks three more estimations of the blood calcium content had been made since the operation, and again the average was approximately 15 milligrammes per 100 cubic centimetres; the detailed figures were 15·2, 14·9 and 15·0 milligrammes. The headaches had cleared up and the neck stiffness had diminished.

Dr. McLean said that Dr. James would welcome opinions as to whether a further attempt at parathyreoidectomy was advisable and suggestions as to how an adequate exposure of the site of operation could be obtained in such a short-necked patient.

PROFESSOR R. M. ALLAN said that the patients presented by Dr. Ross and Dr. McLean should be discussed together.

DR. EDGAR KING said that the cases had been specially interesting because they were rather atypical examples of *osteitis fibrosa cystica*. The significance of this title was that fibrous and cystic changes occurred in the bones. It was not many years since the great objection to removal of a parathyreoid gland had been overcome. In recent years the association between bony changes and pathology of the parathyreoid tissue had been recognized. Hyperparathyreoidism and these changes in bone were, however, not synonymous. Two groups of conditions should be differentiated. In one the bony changes were due to a parathyreoid abnormality, and in the second group the parathyreoid tissue was normal.

Dr. King went on to say that the female patient's condition was almost certainly parathyreoid disease, but whether the affected gland was on the other side or even just inside the thyreoid gland was problematical. In the other case Dr. King said that the condition was almost certainly not parathyreoid disease. The cause in such cases was unknown, but the probable ætiological factors were general metabolic disturbances or affections of ductless glands other than the parathyreoid gland.

DR. S. O. COWEN said that he had seen the boy shown by Dr. Ross because of the attitude adopted by Sir Alan Newton, who had seen the films and talked to the parents. He had considered that if the blood findings were normal it was no use trying to find a parathyreoid tumour. Dr. Cowen wondered whether any credence was to be placed in the findings of some American surgeons, who said that they had found parathyreoid tumours in the presence of normal blood chemistry. He said that he would be glad to hear a discussion on the best terms to be used in the diagnosis of these conditions, with suggestions for treatment other than surgical. He had advised the use of calcium gluconate and of "Calciferol". He recalled a patient, shown at a meeting by Sir Charles Blackburn, whose condition was typical of generalized *osteitis fibrosa cystica* with increased calcium deposits in the bone, and wondered whether it was safe to use calcium and "Calciferol" therapy.

DR. DOUGLAS THOMAS said that in the case of the boy he had no fixed feeling except that the condition was not hyperparathyreoidism; before a definite diagnosis could be made he would like further information. The supra-aural grooving and the well-marked pointing over the occiput were suggestive of *fragilitas ossium*. With reference to the other patient, Dr. Thomas said that it was possible to arrange a series of radiographic films of a number of different patients in such a way that the series presented a gradual transition from the features characteristic of hyperparathyreoidism to those of Paget's disease. He expressed the opinion that the films shown of the patient presented on behalf of Dr. James were those of hyperparathyreoidism rather than those of Paget's disease. He did not think it was possible to say where the area was to be found in which the pathological parathyreoid tissue was present. Donald Hunter had shown a patient in whom blood chemistry had proved the diagnosis of hyperparathyreoidism. He had carefully explored the neck on both sides without finding any

evidence. Hunter had said that it must be present as an ectopic area and that if it was not inside the thyreoid gland it must be inside the chest somewhere, and that there always was such an area. Dr. Thomas considered that it should be looked for on the other side of the neck in the patient shown.

DR. ERIC COOPER said that in the case of the lady shown on behalf of Dr. James he found himself in agreement with what Dr. Thomas had said. Some of these patients started off with conditions typical of *osteitis fibrosa* and finished with Paget's disease. The findings in the bones could be regarded as a combined picture. He quoted the statement that the abnormal parathyreoid tissue should be searched for even if this meant operating nine times and finally dissecting it off the aorta. With reference to the boy, Dr. Cooper said that the normal blood calcium findings did not exclude the diagnosis of *osteitis fibrosa generalisata*. It was important in such a case to have a calcium balance investigation made and to make an estimate of the plasma phosphatase, the raising of which was more reliable than that of the urinary phosphatase in this disorder. The presence of a gross renal defect was also possible and the renal function should be carefully estimated, particularly if an operation was contemplated. The mortality in this condition had proved to be worse in those patients with normal or low blood calcium than in those in whom the blood calcium was raised.

Dr. Cooper also said that the changes in the skull shown in the films of these two patients were of very great interest. He thought that these two weird types of skull changes could be produced by a similar ætiological factor. It had interested him to note that the London school referred to many examples of hyperparathyreoidism and that few were seen at the Mayo Clinic. It was probable that there was a regional distribution and that the condition was a regional disturbance linked up in some way with the intake of vitamin *D*. Many patients were found, for example, in the Nordic countries of Europe, with little sunshine, and in the sunnier Mediterranean countries very little evidence of the disease was found. Dr. Cooper said that his interest in the subject had been stimulated by the fact that when he was a resident medical officer at the Melbourne Hospital he had been responsible for missing the diagnosis in the first patient operated on for hyperthyreoidism in Australia.

DR. STANLEY WILLIAMS, in response to Dr. Cowen's request for a discussion on terminology, said that while at the Children's Hospital he had formed the habit of regarding the bone conditions under consideration under three headings: generalized fibrocystic disease, multiple fibrocystic disease of bone, and solitary cysts in bone. The absence of much pain in the older patient shown was contrasted by Dr. Williams with the emphatic way in which Hunter had demonstrated a patient's pain as so tremendous that four nurses were needed to put the patient on the trolly, and yet after the operation the pain had miraculously disappeared.

DR. F. KINGSLEY NORRIS recounted the clinical details of a small girl of whom he had known for some eight years. The child travelled with her father, who was the representative of a well-known firm of makers of carpet-sweepers. The child sustained a fracture of the femur about every six months, and the father carried with him the apparatus for applying Hamilton Russell extension. He was able to put the leg in the apparatus rapidly and very efficiently, but many doctors had had the experience of being sent for in emergency when the little girl broke her leg.

Aseptic Traumatic Thrombosis of both Cavernous Sinuses.

DR. C. E. BACKWELL showed a male patient, aged fifty-one years, who had been struck on the left side of the head by a motor cycle on March 22, 1937. On admission to the Geelong Hospital he was unconscious, and it was found that he had sustained fractures of the skull and of the mandible, with proptosis of the left eye. On examination the left eye was found to be proptosed and pulsating, with medium distension of the fundal veins, and a large extravasation of blood extended down the left side of the neck to the clavicular area. Vision was limited to hand movements only, there were no extrinsic ocular movements, and the pupil was dilated, slight reaction to light being present.

Dr. Backwell said that a diagnosis was made of rupture of the left cavernous sinus with probable puncture of the left ophthalmic artery. The vision of the left eye gradually diminished, and blindness ensued by the fourteenth day. The eye became extremely proptosed and chemosed. Pulsation of the left eye ceased during the fourth week, and at that time retroocular clotting took place from the inner canthus outwards. Intermittent epistaxis occurred from ethmoidal veins, which had dilated in taking up the collateral circulation. During the sixth week there was slight diminution of the extrinsic ocular movements in the right eye, followed next day by early chemosis of the right conjunctiva and distension of the right fundal veins associated with some photophobia. The right cavernous sinus had become progressively thrombosed, and for four weeks the right eye had been undergoing proptosis. During the past week some extrinsic movement of the left eye had been regained because of the establishment of sufficient collateral circulation and of the diminution of œdema and chemosis.

At the time of the meeting the left eye was blind. Optic nerve atrophy was present, the fundal veins were of normal appearance, and the orbital œdema and chemosis were subsiding with the increasing collateral circulation. The vision in the right eye had been stationary for a week and the patient could count fingers at one metre; the fundal veins were distended and the establishment of collateral circulation was in progress.

Dr. Backwell said that he thought the prognosis for life was fairly good, provided that extension of the clot into the transverse sinus and down to the jugular bulb did not occur. The left eye was already blind and the outlook for sight in the right eye was fair, provided that no further damage was done to the right optic nerve as a result of its being stretched.

DR. H. F. MAUDSLEY said that he had seen the condition confined to one side after fracture of the skull. The patient had recovered, but with unilateral blindness.

DR. A. E. COATES said that with the external ophthalmoplegia present he was rather worried about the state of the good eye, and wondered whether, *faute de mieux*, it would be advisable to operate according to the technique of Naffziger, who in certain severe cases of goitre lifted up a frontal osteoplastic flap and removed the roof of the orbit, exposing extradurally a commodious space in which the eye could be accommodated. After this operation the tissues of the whole face would be swollen and bruised for a time, but the sight of the eye might be saved.

Caecostomy for Carcinoma of the Transverse Colon.

DR. ORMOND GREEN discussed colonic resection operations and described the usual caecostomy procedure. He then went on to give the details of a more radical caecostomy he had performed to get a good diversion of contents. He showed the patient upon whom he had operated, and mentioned the pertinent facts in the clinical history. He commenced by referring to the high mortality of colonic resections when the resection and the anastomosis were made in a bowel containing fæces. For the one-stage operation there was a mortality of 20% and for the two-stage procedure the mortality was 15%. The mortality rate was practically 100% if resection and anastomosis were made in the presence of obstruction. At the Mayo Clinic during the years 1915 to 1925 the mortality rate for all classes of colonic resection was 22%. Grey Turner, for one-stage hemicolectomy for caecal carcinoma, had a mortality rate of 18%. Dr. Green also referred to the figures of Bertrand, of the Lyons Clinic. For one-stage resection the mortality rate was 28% and for the exteriorization method or resection with caecostomy it was 21%.

Dr. Green emphasized the necessity for a policy of "safety first" by adoption of the principle of complete exclusion, as exemplified in Devine's operation for growths on the pelvic colon. At the first operation the growth was explored through a left-sided incision in the lower part of the abdomen, and if it was decided to proceed, a transverse colostomy loop was brought out through a second incision in the right side of the upper abdominal wall. At the second operation the growth was resected and the anastomosis was made well away from the transverse colostomy opening. At a third operation the colostomy spur was crushed, and at a fourth the colostomy fistula was closed.

Dr. Green then showed an elderly lady upon whom he had operated for carcinoma of the transverse colon by a method of complete exclusion. Gross chronic obstruction had been present and an acute climax had occurred. He said that he had tried to overcome the disadvantage arising from the passage of fæces into the ascending limb of the colon through an ordinary caecostomy, and the steps he had taken had proved successful in this respect. At the first operation, on March 6, 1937, he explored the growth through a right-sided upper abdominal incision, performed caecostomy through a small grid-iron incision in the right iliac fossa, and fixed a Paul's tube in position. He also secured the edges of the caecum in two places to hold it well out. He had been able to identify the opening to the appendix and the ileo-caecal valve when the tube was removed, but the entrance to the ascending colon was well out of the way. A little later the ileo-caecal valve had become the summit of the pouting caecostomy and the entry to the ascending colon was a mere slit well out of the way. At a second operation, on March 29, 1937, he removed the growth and made anastomosis through a transverse right upper abdominal incision. The caecostomy had worked well, being kept under control by digital reduction of the prolapse and by a golf ball strapped over the ileo-caecal valve opening, except when the contents were to be discharged. After the golf ball had been worn, most of the prolapse was reduced back into the parietes or the abdomen, and the caecostomy was then little more than a rosette. At a third operation, on May 28, 1937, the fistula had been closed and the patient had made a good recovery. She was finally discharged from hospital on June 15, 1937, eleven weeks after admission. The pathologist had reported the presence of adenocarcinoma in the sections examined.

DR. VICTOR HURLEY congratulated Dr. Green on the healthy appearance of the patient, and thanked him for the novel suggestion he had made for a more radical caecostomy. Dr. Hurley agreed that it would result in a much better division of contents than the caecostomy that was usually practised. The more exteriorization methods that could be used in colon surgery, the safer the resection became. Exteriorization could frequently be made use of in cancer of the sigmoid and transverse colon, but in the majority of cases of colonic cancer it was not possible in his hands. Exteriorization methods, however, could be used only at the price of less free removal of the growth than was often desirable. In growths of the transverse colon Dr. Hurley preferred caecostomy with wide resection of the growth together with the mesentery; and he said that in such cases the caecostomy almost always closed spontaneously after the second operation and no necessity for a third operation arose. Dr. Hurley was struck by the fact that the ileo-caecal junction had risen as described. He would not have expected this, and it had contributed to the success of the treatment. Had it not happened, there would in all probability have been for the patient a longer period under treatment, together with the discomfort of the irritating discharge usually met with in an open caecostomy. For his ingenuity and carefully worked out technique Dr. Hurley considered that Dr. Green was to be warmly congratulated.

DR. JOHN KENNEDY commented on the long time that colon exclusion by means of caecostomy had been used before excision of a growth on the transverse colon. He said that a growth in this position was not handled so easily and carried a greater risk than was the case with sigmoid growths. He pointed out that in a special type of colostomy, in which the bowel was lifted out four inches and separated from the mesentery, none of it died, but in a similar procedure for a growth on the transverse colon the portion of bowel lifted out was likely to die. He had the impression that the blood supply in the transverse colon was not so good as that in the sigmoid colon. In conclusion, he wondered whether it would not have been possible for Dr. Green to have performed a Mikulicz operation on the patient he had shown.

Dr. Green, in reply, said that he could just have removed the growth but not any mesentery, and he had preferred not to take the risk.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Armstrong, Kenneth Charles, M.B., B.S., 1936 (Univ. Sydney), 26, Clanalpine Street, Mosman.
Cooper, John Huon, M.B., B.S., 1938 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Hill, Bruce Goodwin, M.B., 1935 (Univ. Sydney), 517, Pacific Highway, Killara.
Hoskisson, Sylvia Mary, M.B., B.S., 1936 (Univ. Sydney), Springfield, Gunnedah.
Ley, Charles Pattinson, M.B., B.S., 1938 (Univ. Sydney), Sydney Hospital, Sydney.
Macintosh, Alexander Mackay, M.B., B.S., 1938 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Meyer, Frank Graham, M.B., B.S., 1938 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Robinson, Arthur Ross, M.B., B.S., 1938 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
Taylor, Sylvia Isabel, M.B., B.S., 1938 (Univ. Sydney), Royal North Shore Hospital, Saint Leonards.
Rice, Charles George, M.B., B.S., 1938 (Univ. Sydney), Canterbury District Hospital, Campsie.

Medical Societies.

THE MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held on September 8, 1937, at the Children's Hospital, Carlton, Melbourne, DR. ROBERT SOUTHBY, the President, in the chair.

Epispadias.

DR. J. G. WHITAKER showed three patients with epispadias who were in the hospital together. He referred to the rarity of the condition and the coincidence which enabled him to show them all that night. He mentioned that though the embryology of hypospadias was simple, that of epispadias was complicated, and time did not permit nor were the facts sufficiently well established to justify a full discussion.

The first child was a male baby who was able to pass urine *per urethram* and from the *glans penis*; a dorsal slit was present which did not communicate with the urethra, and the *labia minor* appeared to be present. The penis was curved ventrally, producing a "hook", and the vestigial prepuce formed a "hood". On drawing the penis forward a deep pubic cleft could be brought into view and the pubic bones were widely separated. He had made an attempt to anchor the hood to the scrotum, which had failed, and he did not propose to do anything

more than this simple procedure; in such a case no adventurous surgery was justifiable because the anomaly was not incompatible with normal functioning of the organs.

Dr. Whitaker's second patient was a boy, three years of age, with complete epispadias of the peno-pubic type. A broad spatula-like penis had resulted; he was fairly incontinent, but not quite, and the bladder was large and the pubes were widely separated. Dr. Whitaker said that he had carried out the first stage of the operation associated with the name of Denis Browne, the Australian surgeon at Great Ormond Street Hospital for Children in London. He proposed as a next step a sphincteric repair by the transpubic route with a subsequent repair of the penile deformity. This procedure had been recently described by Hugh Young as practicable.

The third child was a little girl with complete epispadias, upon whom Dr. Whitaker had done a complete sphincteric repair operation. The repair had, however, broken down and he had carried out the Coffey method of double transplantation of the ureters into the rectum. The child was passing large quantities of urine *per rectum*, but the treatment could not yet be regarded as a complete success. He stated that, in contrast to the first case, any adventure was worth while for the second and third children, because the conditions present were not compatible with a useful life.

Premature Puberty.

DR. A. P. DERHAM showed a girl, eight years and six months of age, who had the appearance of being about twelve years of age. The body build was slight and there was no suggestion of adiposity. She was a pretty little girl with a good complexion and keen intellect. It was said that she had had two epileptiform fits at the age of two years, but not since. Before reaching the age of five years, she had begun to suffer from attacks of colicky abdominal pain associated with headaches and lasting for a day or two. About this time her mother had noticed development of the child's breasts and the growth of pubic hair. At five years of age menstruation had commenced. The first period lasted for nine days. The second period occurred three months later, and from that time she had menstruated every three weeks. The menstrual flow was very profuse unless the child was kept in bed. She had been kept away from school and had been educated by correspondence. Early in the present year, soon after a severe attack of bronchitis, she had had rheumatic fever followed by persistent pyobacilluria. Six weeks before the meeting a second attack of rheumatic fever had occurred. Dr. Derham mentioned that the social attitude of the child was that of a girl aged about twelve years, but her general intelligence was approximately at the level of nine years. Apart from the excessive development of the external genitalia and the establishment of the presence of a large retroflexed uterus by rectal examination under general anæsthsia, physical examination had revealed no definite abnormalities of the viscera, with the possible exception of slight enlargement of the left ovary and questionable increased palpability of the right kidney. Plain and stereoscopic films of the skull had been examined, and the opinion was given that the pituitary fossa was within normal limits. By retrograde pyelography the right renal pelvis had not filled, and though traces of dye were present the outline was not visualized; the left renal pelvis was considered to be within normal limits. By intravenous pyelography good function of each kidney was demonstrated; the left pelvic outline was normal, but again the right pelvic outline was not clearly seen. The child was a little anæmic; the red cells numbered 4,630,000 per cubic millimetre and the hæmoglobin was estimated by the Sahli method to be 71%. At the time of the meeting the child was slightly feverish and the pyobacilluric condition had not cleared.

Dr. Derham asked for assistance in the diagnosis. At first he had considered the possibility of the presence of a tumour of the adrenal cortex. The absence of other evidence in the case of the girl he had shown enabled him, however, with confidence to exclude this condition. If she had a tumour of the ovary with increased production of œstrin which had caused the precocity, the removal of the tumour might have important beneficial effects. He had read of animal experimentation, particularly on mice, in which pituitary dysfunction was associated with premature sexual development, but he was not satisfied that it was safe to draw the analogy and apply the findings to human beings.

DR. RUSSELL HOWARD said that while abroad he had become interested in the subject under discussion and had seen a number of cases. Much of the literature was in Spanish, but he understood that the precocity could be attributed usually to (*a*) pineal tumour, (*b*) tumour of the thymus, (*c*) adrenal cortical tumour, or (*d*) arthenoblastoma of the ovary. In each of these four conditions the patients showed a reversion to the male type. In other patients the precocity was attributable to (*e*) granulosa-celled tumour of the ovary or (*f*) pituitary disorder or tumour. He thought that in Dr. Derham's patient one of the two last-named conditions was present.

PROFESSOR MARSHALL ALLAN and DR. J. S. GREEN each thought that the possibility of the presence of an ovarian tumour should be kept well in mind.

Dr. Derham, in reply, thanked those who had made suggestions, and indicated that it was likely that he would decide to advise laparotomy at a later date. He promised to make a progress report at a subsequent meeting of the society.

(*To be continued.*)

THE MEDICAL DEFENCE SOCIETY OF QUEENSLAND.

THE annual meeting of the Medical Defence Society of Queensland was held at British Medical Association House, 225, Wickham Terrace, Brisbane, on February 3, 1938, DR. ALEX. H. MARKS, the President, in the chair.

Annual Report.

The annual report of the council and the financial statement for the year ended December 31, 1937, were presented and adopted on the motion of the President, seconded by Dr. A. G. Anderson. The report is as follows.

The council has pleasure in presenting the following report of the society for the year ended December 31, 1937.

Membership.

The total membership of the society is 375, exclusive of 15 members whose subscription for the current year had not been paid by December 31, 1937.

Our gains have been as follows: new members, 33; reinstated members, 4; making a total of 37. Losses have been as follows: resignation, 1; left the State, 5; members deceased, 4; unfinancial members, 15; making a total of 25.

As last year's membership was 363, the total increase for the current year is 12.

We regret to record the deaths of the following members: Dr. Donald A. Cameron, who was one of the original members of the society; Dr. G. W. F. Paul and Dr. L. W. N. Gibson, of Brisbane; and Dr. E. F. Perry, of Goondiwindi.

Office-Bearers and Council Elected for 1937.

President: Dr. Alex. H. Marks.
Vice-President: Dr. S. F. McDonald.
Honorary Secretary: Dr. Neville G. Sutton.
Honorary Treasurer: Dr. R. G. Quinn.
Councillors: Dr. A. G. Anderson, Dr. A. B. Carvosso, Dr. G. W. Macartney, Dr. W. N. Robertson, Dr. Kenneth Wilson, Dr. H. S. Waters.

Medico-Legal.

During the year eight cases were submitted to the council for advice or assistance. In one case, at the suggestion of the judge, the parties conferred and the plaintiff withdrew all charges of negligence and defamation, and agreed to a judgement being entered for the doctor, and also paid half the costs. Two cases concerned public hospital patients, one of which was not proceeded with by the patient, and in the other case the hospital authorities accepted responsibility for the cost of legal advice. This case also was withdrawn. One case for damages has been dropped by the claimant, and in another case an apology was extended to the doctor by the patient. Legal advice was obtained for a member regarding responsibility for medical fees by an employer. In reply to an inquiry a member was informed that the society does not defend defamation cases. In the last case further information was sought from a member before the council could express an opinion.

New Premises.

In March, 1937, the office of the society was moved to the new premises occupied by the British Medical Association at 225, Wickham Terrace, Brisbane.

Finance.

The total assets of the society are £4,410 12s. 6d., practically all of which is invested in Australian consolidated treasury bonds. Two hundred Queensland Medical Land Investment Company Limited shares, valued at £100, have been purchased by the Queensland Branch of the British Medical Association. The total expenditure amounted to £211 10s. 11d., of which £160 2s. 5d. was paid for legal costs and £51 8s. 6d. for current expenses. The sum of £238 19s. 3d. was received from entrance fees and subscriptions, and income from investments totalled £160 2s. 2d. The year's operations have resulted in a credit balance of £189 18s. 6d.

(Signed) Alex. H. Marks,
President.

Election of Office-Bearers.

Dr. W. N. Robertson, Dr. G. W. Macartney and Dr. A. B. Carvosso retired in conformity with the by-laws of the society. Dr. Robertson and Dr. Macartney were reelected, and Dr. L. P. Winterbotham and Dr. Gavin H. Cameron were elected to fill the other vacancies. Owing to the death of Dr. Donald Cameron an extra vacancy occurred which had not previously been filled.

The chairman paid a tribute to the long service that had been given to the council by Dr. A. B. Carvosso, who was a member at the inauguration of the society in 1901, and who was not seeking reelection for the ensuing year.

Messrs. R. G. Groom and Company, chartered accountants (Australia), were reelected auditors.

Correspondence.

ANTERIOR POLIOMYELITIS.

Sir: Dr. Kent Hughes's interesting article in The Medical Journal of Australia, Number 8, mentions Professor Bordier's method of treatment of anterior poliomyelitis.

Bordier, of Lyon, introduced this method in 1911 and used it since with satisfactory success. He began with cases of chronic poliomyelitis (progressive muscular atrophy) and extended the treatment to cases of acute poliomyelitis.

The method was a combination of X ray therapy of the cervical and thoraco-lumbar spine—indicated in exact detail in later publications of Bordier—and diathermy of the diseased limb or atrophic parts of the body.

The success of this method has been recognized in many publications since, some authors applying X rays alone or X rays combined with galvanotherapy and diathermy. Bordier himself published later another series of successful cases—*inter alia* the case of a doctor's child coming to treatment six years after onset—and he regards exact technique as a fundamental condition for success.

The treatment has to be begun as soon as possible after the temperature has reached normal.

The theoretical basis is clear:

(1) X ray on the diseased part of the spinal marrow. Effect: destruction of the extensively growing connective tissue and the new blood vessels, resorption of the exudate. In short, the theoretical basis of the nowadays—after years of discussion—generally recognized indication of X ray treatment in syringomyelia. Nevertheless, it is to point out that in contrary to syringomyelia, X ray treatment in spinal paralysis is not generally accepted.

(2) Diathermy of the affected limb. Effective in hypothermy to warm the affected muscle during the time of expectation of the healing of the spinal marrow.

After about seventeen years of scientific discussion, Antonio d'Istria summarizes the results as follows.

Diathermy is excellent by acting upon the blood circulation. Rhythmic galvanization (of course in cases of response of the affected muscle on galvanic stimulus), like massage, to be adapted to the individual cases. Neither galvanization nor diathermy can replace X rays in its effect on the spinal marrow.

As regards other radiation treatment, there are not many publications in literature. Levick, *British Journal of Radiology*, claims success with red rays in cases of spinal paralysis. I cannot at present ascertain whether he used, in addition to the visible red, notable intensities of infra-red of penetrability 10 to 30 millimetres respectively, long wave, infra-red of 5 millimetres penetrability. I cannot trace approving reports regarding the red ray treatment.

Delacroix recommended warm sea-water baths in combination with ultra-violet rays. I admit that this is a very effective method for generally improving the defence mechanism of the patient. We know, since Bernhard and Rollier in Leysin, 1909, the not only general but specific effect of ultra-violet rays on cases of the so-called surgical tuberculosis. We know also, since Hauser's and Vahles's excellent observations, that only a very small portion of the ultra-violet radiation is biologically effective and that very interesting conditions prevail in the matter of absorption by the skin, but we have no exact knowledge at all about a specific effect in poliomyelitis.

No doubt we can destroy the virus in a half millimetre deep suspension by ultra-violet radiation, but we cannot reach the virus in man with radiation of very restricted penetrability, nor has any publication appeared mentioning exact results of the ultra-violet treatment of the sequelæ of spinal paralysis. We would have to rely on theories like the photo-activity of the blood, and here further research is necessary.

What makes the comparison of different treatment methods so difficult is the lack of any exact way in determining the degree of the pathological process and the crux of the prognosis. We know that the extension of the paralysis is of no importance for the prognosis, as a large paraplegia can wholly disappear and isolated paralysis of a small muscle group can become permanent. If in one muscle the reaction of degeneration (R.D.) without treatment makes place for improvement and in the other remains permanent, then, in my opinion, the reaction of degeneration is not exact enough to give us an impression of the extension of the pathological process and the functional consequences.

In this connexion I would like to draw the attention of the authorities in Victoria and New South Wales to the simple electrical method of chronaxy developed by Lapicque, Delherm and Bourguignon, of the University of Paris. In practising this method in Professor Delherm's electro-radiological department of the Hôpital de la Pitié I was much impressed by the perfection of this method of examining the neuro-muscular response in adults and children. I found this young method and the more complicated Amiot high-frequency curves an excellent way for determining the degree of degeneration of nerve and muscle, and for following the development and the extension of the degeneration.

The reaction of degeneration of Dubois Reymond, depending from the intensity of the current, is only valid from a certain limit of duration of the stimulus. If we increase the speed of the electrical attack by utilizing the discharge of condensers in a circuit with no inductive resistances, then the quantity of electricity or the time of duration is important in establishing reactions of a certain regularity.

The chronaxy is really a time factor based on the speed of excitability, that is, the speed of the nerve current *plus* the speed of the contracting movement. Chronaxy gives already diagnostic results long before the reaction of degeneration shows any indication of degeneration. The first examination taking place if possible a fortnight after onset, the cases would have to be closely followed, and charts could enable us not only to have a mathematically precise material for comparison of treatment methods, but also to have a guide in the survey of the treatment.

Another remarkable difference between the reaction of degeneration and chronaxy is the fact that the strength of the reaction in the reaction of degeneration differs and is strongest on the so-called motor point of the muscle, that is, the point where the nerve divides, while the chronaxy on the healthy, not partially degenerating muscle, is the same on the nerve, the motor point, and the whole muscle.

A paper, "Chronaxy in Poliomyelitis", will be published later.

Yours, etc.,

Max Michel.

Wickham Terrace,
Brisbane,
February 26, 1938.

ABDOMINAL OPERATIONS AND ENTEROPTOSIS.

Sir: The prolapse of the intestine is not the only one which can take place in the abdomen—other organs may be affected, but the term enteroptosis introduced by Frantz Glénard includes all. There can be no prolapse of any organ without the bowel being affected.

The cause of the ptosis is the degeneration of the elastic fibres in the peritoneal ligaments fixing the abdominal organs to the posterior abdominal wall. As a result of a tubercular infection in individuals showing a certain resistance the ligaments lose their elasticity and are stretched.

But as tubercular activity is intermittent there may be long intermissions—years even. We can never feel assured that the diseased process has been definitely arrested. During these periods of repose it is remarkable that although a pronounced degree of ptosis can exist, the patient does not complain, showing the marvellous compensatory powers of the body. A gastro-enterostomy may be very successful or otherwise. It depends on how long the new adjustment will counteract the old. A further ptosis may, and often does, upset it.

That is why Victor Pauchet, one of the leading French surgeons, says: "One must not think twice, but many times, before operating on a patient with enteroptosis—of course with the idea of benefiting the patient."

In all cases the wearing of a properly fitted abdominal belt is indispensable, and it must be worn constantly.

Yours, etc.,

J. Morris Roe.

Victory Chambers,
Queen Street,
Brisbane.
February 11, 1938.

Post scriptum. It is particularly a complaint that quacks can score on, for a further fall may take place at any time and correct the original. When this takes place the person treating claims a success.

Obituary.

TRUBY KING.

The name of the late Sir Truby King was a household word with all those who gave any attention to child welfare. He was known widely and was respected in the Dominion of New Zealand, in the Commonwealth of Australia and throughout the scientific world. Mothers usig his methods would often say: "My baby is a Truby King baby", and there is no doubt that he brought understanding, peace and happiness into countless homes. He has been described by a leading journal as one of the greatest humanitarians of the century. He was certainly a bright star in the New Zealand firmament, and many will grieve that the Dominion has lost so noble a son. He did not originally intend to study medicine; he started life as a bank clerk, but subsequently went to Edinburgh in 1880 to study medicine. At his graduation in 1886 he was awarded the much-coveted Eccles Scholarship. After special study in public health he took the degree of bachelor of science in public health. He became resident medical officer at the Edinburgh and the Glasgow Royal Infirmaries and then went to New Zealand, where his life's work may be said to have begun. His chief care was the feeding of babies, for he held that by attention to child hygiene humanity could be enriched. He founded the New Zealand Society for the Health of Women and Children, later called the Plunket Society, after the wife of the Governor-General, who took such an interest in it and the promotion of its welfare. The low infantile mortality of New Zealand is today the envy of most countries in the world, and this New Zealand owes largely to the vision, the energy and the determination of Truby King. We sympathize with New Zealand in her great loss.

Dr. Raymond Green writes:

It is fitting that we in Australia should pay a tribute to the late Sir Truby King, as the mothercraft and infant welfare in the Commonwealth owes a great debt to his work in New Zealand, which showed us and the world in general what could be accomplished by the organized education and supervision of mothers.

To this work he brought a fine brain and wide scientific knowledge, coupled with the enthusiasm and driving force of a single-minded purpose. His grasp of the factors influencing growth, animal and vegetable, was gained by close observation, and the principles he laid down for the nutrition and care of infants were based on these important truths.

It must be realized that his main desire was the spread of knowledge of the principles of natural feeding and the education and encouragement of mothers in the carrying out of this function. The methods of artificial feeding, the rules of hygiene for the baby and nursing mother followed naturally. These were also based on close and critical study, and the results prove how well founded are the principles.

One could fill many columns with illustrations of the breadth of his vision, his keenness and wisdom, but the many tributes in the public Press bear witness to the success of his work.

The man himself, lovable, enthusiastic and totally unsparing of self, with his flair for apt and often humorous illustration of the point under discussion, will long live in the memory of those who had the privilege of his friendship.

Books Received.

ARTIFICIAL FEVER PRODUCED BY PHYSICAL MEANS: ITS DEVELOPMENT AND APPLICATION, by C. A. Neymann, A.B., M.D., F.R.S.M.; 1938. London: Baillière, Tindall and Cox. Super royal 8vo, pp. 309, with illustrations. Price: 27s. net.

THE OCCUPATIONAL TREATMENT OF MENTAL ILLNESS, by J. I. Russell, M.B., Ch.B., F.R.F.P.S., D.P.M., with a foreword by W. Rees-Thomas, M.D., F.R.C.P., Dip. Psych. Med.; 1938. London: Baillière, Tindall and Cox. Demy 8vo, pp. 247, with illustrations by J. B. Morgan. Price: 6s. net.

Diary for the Month.

Mar. 22.—New South Wales Branch, B.M.A.: Council (Quarterly).
Mar. 23.—Victorian Branch, B.M.A.: Council.
Mar. 24.—South Australian Branch, B.M.A.: Branch.
Mar. 24.—New South Wales Branch, B.M.A.: Annual Meeting.
Mar. 25.—Queensland Branch, B.M.A.: Council.
Mar. 29.—New South Wales Branch, B.M.A.: Council (Election of Officers and Standing Committees).
Apr. 1.—Queensland Branch, B.M.A.: Branch.
Apr. 5.—New South Wales Branch, B.M.A.: Organization and Science Committee.
Apr. 6.—Victorian Branch, B.M.A.: Branch.
Apr. 6.—Western Australian Branch, B.M.A.: Council.
Apr. 7.—South Australian Branch, B.M.A.: Council.
Apr. 8.—Queensland Branch, B.M.A.: Council.
Apr. 12.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
Apr. 19.—New South Wales Branch, B.M.A.: Ethics Committee.
Apr. 20.—Western Australian Branch, B.M.A.: Branch.
Apr. 21.—New South Wales Branch, B.M.A.: Clinical Meeting.
Apr. 22.—Queensland Branch, B.M.A.: Council.
Apr. 27.—Victorian Branch, B.M.A.: Council.
Apr. 26.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Apr. 28.—South Australian Branch, B.M.A.: Branch.
Apr. 28.—New South Wales Branch, B.M.A.: Branch.
May 3.—New South Wales Branch, B.M.A.: Organization and Science Committee.
May 4.—Victorian Branch, B.M.A.: Branch.
May 4.—Western Australian Branch, B.M.A.: Council.
May 5.—South Australian Branch, B.M.A.: Council.
May 6.—Queensland Branch, B.M.A.: Branch.
May 10.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
May 13.—Queensland Branch, B.M.A.: Council.
May 17.—New South Wales Branch, B.M.A.: Ethics Committee.
May 18.—Western Australian Branch, B.M.A.: Branch.
May 19.—New South Wales Branch, B.M.A.: Clinical Meeting.
May 24.—New South Wales Branch, B.M.A.: Medical Politics Committee.
May 25.—Victorian Branch, B.M.A.: Council.
May 26.—New South Wales Branch, B.M.A.: Branch.
May 26.—South Australian Branch, B.M.A.: Branch.
May 27.—Queensland Branch, B.M.A.: Council.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages xvi to xviii.

Austin Hospital for Cancer and Chronic Diseases, Heidelberg, Victoria: Resident Medical Officer.
Brisbane and South Coast Hospitals Board, Queensland: Medical Superintendent.
Broken Hill and District Hospital, Broken Hill, New South Wales: Resident Medical Officer.
Lachlan Park Hospital, New Norfolk, Tasmania: Medical Officers.
State Public Service Board, Queensland: Chairman of the Medical Board.

Medical Appointments: Important Notice.

Medical practitioners are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
New South Wales: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
Victorian: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
Queensland: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
South Australian: Secretary, 178, North Terrace, Adelaide.	All Lodge appointments in South Australia. All contract Practice Appointments in South Australia.
Western Australian: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.

Editorial Notices.

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